

JOURNAL of the American Veterinary Medical Association

FORMERLY
AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Assn.)

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OF THE

American Veterinary Medical Association

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(Original Official Organ U. S. Vet. Med. Ass'n.)

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CONVENTION REPORT NEXT MONTH

THE A. V. M. A. fifty-ninth annual meeting is in session at St. Louis as this issue of the JOURNAL goes to its readers. There is every indication that the convention will be successful in attendance, program and entertainment. Our next number will contain a general report of the meeting as a whole, together with some of the papers. Other papers and the complete proceedings will follow from month to month as rapidly as possible. The fine quality and varied character of the program assure to our readers during the coming months some unusually instructive and interesting material bearing upon all phases of professional activity and interest.

The address of the retiring President, Dr. A. T. Kinsley, is published in this issue. It presents several matters of interest and importance to the Association and the profession in general and makes some good constructive suggestions. It merits careful reading and consideration.

DIVIDENDS FROM GOOD PUREBRED SIRES

LIVESTOCK is recognized as necessary to permanent well-balanced farming. But the astonishing differences in returns which domestic animals pay their owners is seldom realized,

except in experiments or other cases where good and inferior stock is kept at the same time and under similar conditions. Abundant evidence from such comparisons shows that the quality of sires at the head of herds and flocks determines in large degree the amount of returns. In addition the quality of live stock for many years to come depends on the kind of breeding animals used now.

Following are a few timely facts that show the value of carefully selecting breeding stock—especially sires:

Good dairy sires bred to average cows have increased the milk and butterfat production of the offspring by more than 50 per cent. The increase has been followed by additional gains in subsequent generations.

Beef sires of good quality when bred even to native cows produce steers of fair uniformity and market value. Good beef bulls are necessary for the production of rapidly maturing, meaty, blocky and profitable beeves.

A well-chosen purebred boar may be expected to add at least 10 per cent to the market weight of his offspring compared with hogs sired by an inferior boar and receiving the same care and feed. Besides, the better-bred hogs will be more uniform and of superior market value.

Good rams have increased wool production by more than 60 per cent and weight of lambs sired by them to the extent of 50 per cent.

In poultry the results of good breeding are especially pronounced owing to prolificacy and the short period required for maturity. In an average flock a standard-bred male of a meat breed will add fully one-fourth to the market weight of the first generation. In egg production a well selected pedigreed male may be expected to increase the yield of the first generation of pullets fully 50 per cent.

Simple calculations show that purebred sires pay liberal dividends even when the purchase price appears high to persons accustomed to scrub values. In brief, purebred sires excel those of grade or scrub breeding because they increase efficiency in live-stock production. To be sure there is considerable difference in quality among purebreds, but a small percentage of poor specimens must not be allowed to reflect discredit on the sound breeding principles of grading up. The scrub purebred must be eliminated along with other inferior sires. On the other hand, purebred males of high individual merit mean the establishment of better live stock both for the individual and the entire Nation. The use of inferior sires has been costing

farmers and stockmen of the United States fully a hundred million dollars a year—a loss which has no place in modern agriculture. Better sires mean better stock; better stock means better farms; and better farms mean a better clientèle for the veterinarian.

VITAMINS FOUND IN PORK

EVER SINCE the discovery of the presence in certain foods of those mysterious beneficial substances now known as vitamins, it has been thought that they were to be found in animal tissue most abundantly in certain of the internal organs, especially the heart, liver and kidneys, but the Bureau of Animal Industry now announces that they exist in the muscle fiber of beef, veal, mutton, lamb, and pork, and that pork is particularly well supplied with them.

Various cuts of the different kinds of meat were tried, and in every instance pork was found to be relatively rich in vitamins. Pork tenderloin, fresh ham, smoked ham, and pressed boiled ham were tested and the results were much the same with all of them. Beef and veal were relatively lower, while the amounts contained in lamb varied a great deal.

The experimental work consisted in feeding tests with rats and pigeons. Growth was the determining factor in the case of rats. In pigeons deficiency of vitamins was indicated by the development of polyneuritis, a disease to which they are peculiarly susceptible. Feeds rich in Vitamins are of great help in keeping them in health.

This new evidence on the distribution of vitamins in meats should not lead to the conclusion that certain meats are of low nutritive value because they are deficient in vitamins. Meat is one of our most important foods and would continue to be so even though it contained no vitamins.

ANTIS AGAIN ACTIVE

THE ANTIVIVISECTIONISTS are at it again—or yet. Undaunted by numerous and repeated failures to get legislation which will hamper scientific research to accord with their ideas, they are continuing their efforts in a number of States. In Colorado by means of the initiative an antivivisection bill will

come before the voters at the November election. Its provisions are similar to those of the measure that was defeated in California in 1920. If adopted it would abolish all experimental study of problems in general biology and in human and veterinary medicine; it would put a stop to modern diagnostic methods; it would prevent the preparation of vaccines and curative serums and the standardization of drugs by animal tests, and it would greatly impair the usefulness of several laboratories, including the branch pathological laboratory of the United States Bureau of Animal Industry at Denver.

In other States also—Louisiana, Florida, Idaho, Oregon, Washington and California—the antis are getting busy with similar propaganda. A sure way to defeat such efforts is to enlighten legislators and the public. Eternal vigilance is the price of liberty. Let us be vigilant.

MEDICAL ENGLISH AS SHE IS WROTE

"MEDICAL TERMINOLOGY has never distinguished itself by its exactitude, clarity and precision." Beginning with this quotation from the German journal *Virchows Archiv*, the editor of the *Journal of the American Medical Association* in a recent issue proceeds to discuss the shortcomings of medical writers in the use of English. After taking a fling at the loose usage of "cirrhosis" and "apoplexy" the *Journal* continues:

"A difference between infectiousness and contagiousness seems not to exist in the minds of some writers, while others describe the inoculation of animals or patients with serum, as if inoculation and injection were synonyms. The distinction between tuberculous and tubercular is apparently too subtle for many, including writers of excellent repute, who seem to forget that if there exist such things as tubercular leprosy, tubercular syphilids, and normal anatomic tubercles of many sorts, then the words tubercle and tubercular can not possibly be understood to mean specifically infections with *Bacillus tuberculosis*, even if some of the lesions produced by this germ are tubercular; many tuberculous lesions are not tubercular, and many tubercular lesions have nothing to do with tuberculosis.

"Perhaps the worst of it is that we keep on adding errors and monstrosities to our medical nomenclature, so that sometimes it seems more like a jargon than a language. Take the word

vaccine. The word is as badly misused as the principle. Its classical parent means cow, and 'vaccine' was used, of course, because cowpox was the disease transmitted by Jenner in the prophylaxis of smallpox. Certainly the present use of the word vaccination for injection of every possible sort of pathogenic bacteria, to say nothing of pollens and food proteins, has no justification on an etymological basis, and its use for all these things unrelated to the cow is an etymological bull. But, like many another atrocity of the same sort, its careless usage has become so widespread as to fix it, presumably for all time. We are, however, a little encouraged to see that some careful writers have made a slight impression on the prevalent error of speaking of deviation of complement when fixation of complement is meant. Some of these errors we owe to the Germans, who are remarkably lax in their scientific terminology, but one particularly grievous sin we get from the German literature through no fault of the Germans, namely, the literal translation of the compound adjective without rearranging it into English. From this source we get such sentences as 'the blood contains bacteria destroying antibodies' when, of course, the reverse is meant, for the bacteria are destroyed, not the antibodies. We read, likewise, 'albumin containing urine' or 'blood destroying poisons,' phrases that shriek loudly for at least a missing hyphen if they can not have a real English construction. Sometimes it is necessary to rewrite a dozen sentences in a single article just to get around this failure to arrange in English form the translation of the gloriously compounded German adjective, concerning which Mark Twain wrote so lucidly and with so much feeling. As for the habitual and unlimited misuse and abuse of the words 'case' by medical men and 'operate' by surgeons, we have on other occasions expressed our views. The observant physician, however, is beginning to realize at least the fundamental rules governing their usage."

Pennsylvania Farmer says editorially of tuberculosis-eradication work: "There should be a pronounced campaign conducted by every farm organization for the purpose of enlightening all stock owners on the need of persistent and effective measures to stamp it out. Hence, the accredited-herd movement is a good one and should have the active interest of every farmer."

THE ADDRESS OF THE PRESIDENT¹

By ALBERT T. KINSLEY

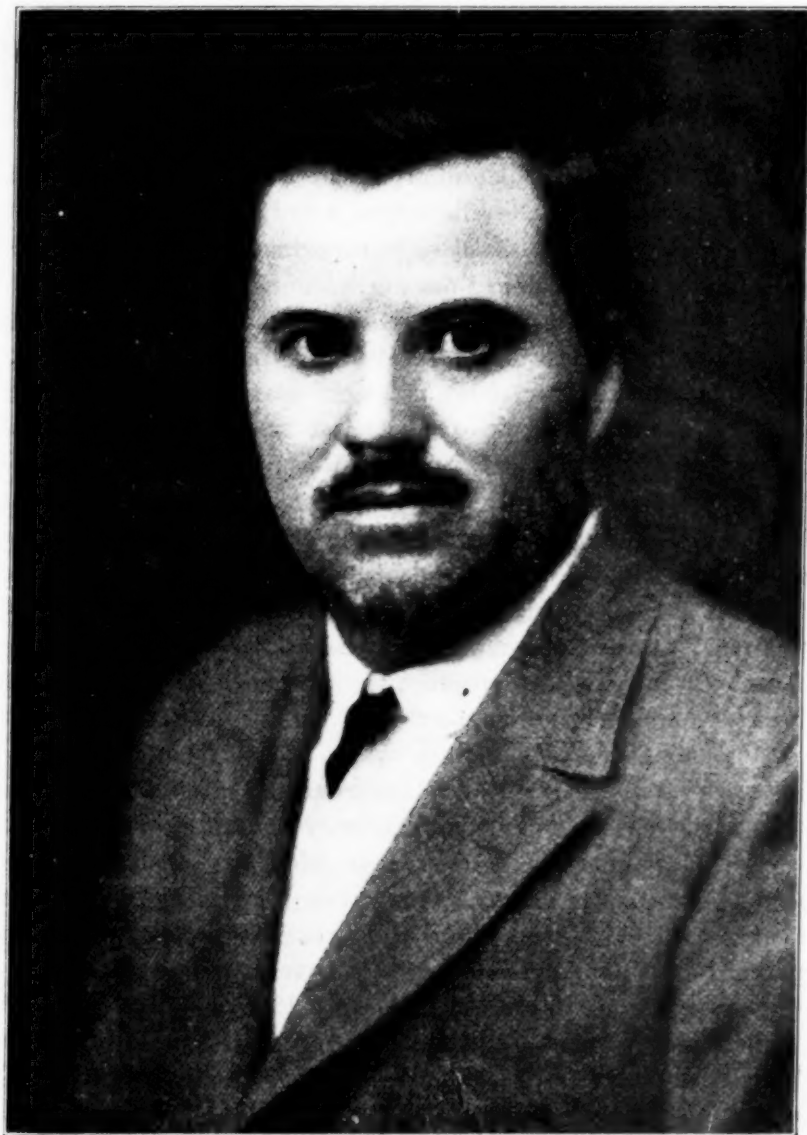
Kansas City, Mo.

IT IS gratifying to see so many delegates and visitors at the opening session of the Fifty-ninth Annual Convention of the A. V. M. A. I am not unmindful of the honor you conferred upon me when you elected me President at the Denver meeting. The official responsibilities were assumed and the duties have been discharged with pleasure. Various questions pertaining to policy have arisen from time to time and the decisions were made for the best interests of the entire profession, according to my best judgment. Errors may have been made, but not intentionally.

The President's address is a requirement, not a privilege, and unfortunately the constitution does not give specifications as to subject matter, length, style nor delivery. In preparing this discourse, the comfort and personal liberties of the audience have been considered and in so far as possible, burdensome details have been eliminated. It has been assumed that the purpose of an address is to review important problems and to indicate policies for the future advancement of the veterinary profession.

The "evolution of the veterinarian to the present standard has been the result of the properly directed efforts and co-operation of the leaders of our profession and has been as rapid as could reasonably be expected, and compares favorably with the development of any other profession." The veterinary profession is composed of veterinarians engaged in various phases of veterinary activities. The different groups that constitute our profession are interdependent. Regardless of the groups we individually represent, we should have broad enough vision to realize the importance of every phase of veterinary activities. All veterinarians whether they be teachers, research workers, practitioners, sanitarians, army officers or those engaged in commercial enterprise, have an important function. Advancement and progress depend upon the harmony existing within and between each group constituting our profession.

¹ Presented at the fifty-ninth annual meeting of the American Veterinary Medical Association, St. Louis, Mo., August 28 to September 1, 1922.



DR. A. T. KINSLEY

A detailed description of the early history of the veterinary profession in America would be superfluous; however, a résumé of veterinary affairs as they have occurred, particularly in the corn belt during the last two decades, is of interest and worthy of careful consideration because there have been more or less unrest and discontentment in our profession during the last two

or three years and the question, "What about the future of the veterinary profession?" is pertinent at this time.

The following remarks are confined in general to the rural practitioner. They are not criticisms, but are the autopsy finders of the last twenty years of veterinary activities in the central states. If we can diagnose the case and identify the cause, the time allotted for this discussion will have been well spent. Until about 1912, practitioners were primarily engaged in the medical or surgical relief of disease; some obstetrical cases, principally in mares; castration of colts; examination for soundness, with an occasional request for tuberculin testing. During this period or until the perfection of blackleg aggressin and filtrate, blackleg vaccination was done almost entirely by stockmen. Equine practice constituted the major portion of the practitioner's routine business, a very small per cent of his income was derived from services rendered in the control of infectious diseases, excepting shipping fever in horses and an occasional enzootic of glanders. Diseases of cattle other than milk fever and occasional cases of mammary disturbances, and those conditions that could be relieved surgically, were given little consideration. Diseases of swine and poultry were rarely given more than a passing thought.

Veterinarians in the Federal quarantine service and those in state service were concerned primarily in the prevention and control of glanders, tick fever and scabies and the eradication of foot-and-mouth disease when it occurred in this country. The Bureau of Animal Industry, several states and some municipalities had inaugurated tuberculosis regulations, but little effective work had been done prior to 1912.

The discovery of the filterable virus of hog cholera by Dorset, McBride and Niles was announced in 1904 and the production of anti-hog cholera serum followed, although this product was not produced in sufficient volume prior to 1912 to be of value in the control of hog cholera excepting in limited areas.

From the foregoing, it is evident that the practitioner formerly confined his efforts primarily to equine practice and principally to the treatment of individuals rather than herds.

Veterinary practice in rural communities in the corn belt is quite different from what it was one or two decades ago. The veterinarian's services at this time are principally confined to

the prevention and control of infective diseases of meat-producing animals in herd units, and twenty years ago it was almost entirely confined to the medical and surgical relief of individual draft animals. The successful veterinarian of today is an immunologist; the successful veterinarian of twenty years ago was a surgeon. The transition of the veterinarian from a surgeon to an immunologist was a sequence of the development of bacteriology and the knowledge that was forthcoming relative to the cause and prevention of microbial diseases. This transition was too sudden and complete for the best interests of all concerned. For instance, some practitioners practically confine their services to immunization of swine, at least during certain seasons. In some sections surgical operations are so rare that they are a novelty. Was the tendency of the veterinarian to specialize as an immunologist for the best interests of the livestock producer? Was the service rendered by the practitioner twenty years ago of value to the livestock owner? Have the conditions that formerly required surgical relief ceased to exist? The answers to these questions should give food for thought and will probably give light for our future guidance.

In addition to the change in veterinary practice there has been a state of unrest in the American people since the close of the war. This condition permeated practically every business and has delayed the return to normal. The psychology of the post-war conditions is difficult to interpret. The financial depression, particularly, of agricultural commodities, was reflected to the veterinarian and was an important factor in the occurrence of unrest in our profession. Because of the sudden reduction in value of livestock, the farmer and stock producer found it necessary to diminish the cost of production which included veterinary services and particularly the charges for immunization of swine against cholera. The discussion, both privately and publicly, relative to this question, was most unfortunate for in many instances it created an unkindly feeling between stockmen and veterinarians. The livestock producers, in some states, sought relief by legislation, because of an apparent restricted sales policy of anti-hog cholera serum and virus. Unfortunately, there was some discord and strife in our ranks and this was used and proved to be a formidable weapon. This controversy was initiated, stimulated and continued by a few indi-

viduals on either side, who we assume had good intentions but the outcome came near being disastrous. This problem probably could have been solved with little or no controversy if the interested parties would have talked to, not about, each other. The "Sin of Pride," according to Dr. Macatee, President of the Medical Society of the District of Columbia, was one of the causes of the state of unrest of the medical profession and would it not be pertinent to ask ourselves whether or not this was and is equally *applicable to the veterinary profession?*

The difficulties that our profession has encountered may have been discouraging but the experience has been valuable. There are periods of depression and perplexing problems to solve in all walks of life. Our moral stability has been strengthened by mastery of the depressing influences and we have developed by the solution of the difficult problems.

The future of our profession is dependent upon our attitude toward and relation with agricultural interests. The degree of success will depend upon progressing, not retrogressing; commending the good work of others, not in slander; cooperation, not discord and dissolution; and a general service, not in a restricted service. We should lend our influences in matters that will make for better livestock production. Every veterinarian should support the cause that is being championed by the Horse Association of America. It must be conceded that the horse is the logical economical power on the average American farm. There will be an increasing demand for good draft horses in the future and the present demand for good saddlers exceeds the supply. The veterinary profession will survive, because veterinary service alone insures the livestock industry against the ravages of disease and is indispensable in the conservation of the health of nations.

The history and development of the American Veterinary Medical Association is a matter of record. The accomplishments, particularly educational and legislative, due to the influences of this association, are well known. The policies of this organization have shaped the destinies of the veterinary profession in America, as well as paving the way for a closer relationship of international veterinary affairs. We should not be contented with past attainments but should anticipate and provide for future progress.

In order that an organization of this character be of maximum service, a large percentage of eligible men should be members. In conformity with this idea a special campaign to increase our membership was inaugurated. The various District Executive Committeemen have cooperated with the Resident Secretaries in their respective districts and all eligible non-members have been advised of the advantages of their becoming members. There are only approximately sixty per cent of the eligible veterinarians in North America enrolled as members. There must be some reason why the other forty per cent are not members. The large percentage of eligible non-members are practitioners. It is difficult for practitioners to attend our conventions and particularly those from the remote sections of the country. Ways and means could probably be devised for stimulating a desire for more eligible veterinarians to attend our conventions, and become active members. Our literary programs could probably be made more interesting for practitioners if more men engaged in practice could be induced to present or demonstrate some important practical subject. Round table discussions on practical subjects would be a means of stimulating more interest and therefore a larger attendance. Diagnostic and surgical clinics are attractive to a certain group of men and would, no doubt, be a drawing card for those who are particularly interested in practice. The time devoted to our business sessions could probably be reduced and thus permit of more time for the literary program.

Considerable time has been devoted to a careful study of the future possibilities of the A. V. M. A. and it appears to be advisable to make some rather drastic changes in our constitution and by-laws, in order that the association can more nearly approach the maximum service. A closer affiliation of this association with state and provincial associations would be an advantage. The necessity for some change was deemed so imperative that a special committee was appointed to investigate and report at this meeting, and it is recommended that the plan suggested by the committee on closer affiliation of this association with state and provincial associations be received and that a committee of five be appointed to confer with the executive committee for the purpose of perfecting plans for re-organization.

There was some discord and lack of cooperation and a tend-

ency for certain groups of our members to form factions. Harmony and cooperation are essential for the success of any organization. Unity signifies strength. The membership of this association represents every phase of veterinary activity, and this association is therefore representative of the entire veterinary profession. Each member should consider himself a committee of one empowered to act in preventing and overcoming discord and strife between individuals or groups. One purpose of this organization is to promote good fellowship and how can this be more effectively accomplished than by ironing out the difficulties, imaginary or real, of fellow members.

The unit of our profession is the veterinarian and this association is the guardian of our profession. Membership in both the veterinary profession and this association increased by leaps and bounds until 1918. The attendance at veterinary colleges in this country reached its maximum in 1912, since which time it has decreased rapidly. In 1914 there were approximately 750 students who were graduated from the veterinary colleges in this country. According to the report of Dean David S. White, the total enrollment in the thirteen state supported colleges in 1919-20 was 800; in 1920-21, 708; and in 1921-22, 641. The total enrollment in all veterinary colleges in North America in 1920-21 was less than one thousand. The financial depression incident to the war was the principal factor causing the sudden and phenomenal decrease in the number of veterinary students and was also responsible for the closing of several privately operated colleges.

The difference in the number and value of farm animals in 1912, the year of maximum attendance in veterinary colleges, and 1922, the year of minimum attendance in veterinary colleges, does not justify the apparent decrease in the demand for veterinarians and in the number of veterinary students. There are less than 12,000 veterinarians and probably not more than 10,000 in the United States engaged in professional services. The average professional man continues in service from twenty to twenty-five years, and if this is applicable to veterinarians there would be not less than 400 retiring from the profession each year. The number of graduates from all of the veterinary colleges each year is not sufficient to maintain our ranks. There is a noticeable increase in the production of better livestock and

this will increase the demand for more and better veterinary service. The temporary surplus of veterinarians will soon be exhausted and then there will be a demand for veterinarians and plans should be devised to increase the attendance at veterinary colleges. Unless there is an increased attendance in veterinary colleges, the number in our profession and the membership of this association will necessarily decrease.

The advertising that was done by privately operated veterinary colleges was of value, not only in obtaining students, but also in keeping the veterinary profession constantly before the public. State supported veterinary institutions appear to have been restricted in their advertising. There has recently been such a scarcity of publicity of veterinary colleges that some men who were interested have inquired of veterinary journals and commercial concerns as to the location of a veterinary college. It would appear that the authorities of the state colleges would do well in perfecting plans for more extensive advertising. If such an advertising campaign can not be executed by the veterinary colleges, I would suggest that some committee or the secretary of this association be authorized to advertise the possibilities of the veterinary profession, referring the inquiries received from prospective students to the most accessible veterinary college. It is not only a privilege but also a duty for every veterinarian to recommend the veterinary profession as a life work to properly qualified young men. In recent years, the difficulty of obtaining funds to defray expenses while in college has denied to some young men the privilege of obtaining a veterinary education, and it would appear as though this association had overlooked the fact that a fund may have been made available for this purpose. I refer to the Salmon Memorial Fund and recommend that arrangements be made so that the interest on this fund be made available at once for the use of some deserving student or students. You should be interested in knowing that the Ladies' Auxiliary has completed arrangements for supplying funds to a veterinary student, thus enabling him to complete his course of study.

This association has continuously labored for a high standard of veterinary education. The progress of our profession has corresponded with the increasing of the educational requirements of veterinary institutions. Our present rank and standing

which compares favorably with that of other learned professions was attained by increasing our educational requirements. The present standard has been attained by the combined influences of this association, the B. A. I., and the War Department. Veterinary colleges should be commended for their cooperation in the advancement of matriculation requirements, in lengthening and broadening of the course of study. Radical changes pertaining to educational matters should be avoided; however, it would probably be advisable for veterinary colleges to provide a more comprehensive course on poultry diseases, sex hygiene and feeds and feeding. A course detailing general business methods and the manner in which a practice should be conducted would be of very great value to the embryo veterinarian and should be incorporated in the curriculum. Veterinary colleges are educating men that will enter the various branches of our profession, such as research workers, teachers, army officers, sanitarians and practitioners. It must be assumed that specialists in a certain branch are familiar with the educational requirements and training that equips men for such service and it is therefore recommended that the constitution and by-laws be so amended that the committee on Intelligence and Education consist of one veterinary teacher, one B. A. I. veterinarian, one army officer and two practitioners. This recommendation is not a criticism of the personnel of this committee or their activities for they have done a wonderful work.

The retrenchment policy of the last congress included a reduction of Army veterinary officers. The necessity for the reduction in the number of Army veterinarians is regrettable but no doubt the efficiency of the Veterinary Corps will be maintained. According to a recent report a veterinarian has been selected for director of the Veterinary Corps. This selection is significant as it indicates confidence, not only in the officer assigned to this duty, but also in the veterinary profession as a whole. This would appear to be a step in preparation for a separate veterinary organization.

The detection and control of tuberculosis is progressing rather rapidly. This is primarily an economic problem. The appropriation both Federal and State, has been sufficient to maintain this work on rather an extensive scale. The area plan is apparently gaining in favor. Those in charge of this work

should not lose sight of the fact that the control of an insidious widespread disease like tuberculosis, depends upon public sentiment. The livestock producer is more impressed by a realization of the stupendous financial loss occasioned by this disease than he is by all other propaganda. The packers have recently proposed to give a premium for swine from those counties in which all cattle have been tuberculin tested and in which proper disposition has been made of all reactors. This will be a stimulus for area eradication. If effective plans are inaugurated that will be acceptable to the stockmen for the maintenance of tuberculosis-free herds in tuberculosis-free areas and also accredited herds, the problem of tuberculosis control would appear to be solved, although the ultimate goal is in the future. This is a sanitary control measure that is of national and international importance and should be supported by our entire profession.

Abortion disease constitutes a very serious problem, viewed economically, because of the extensive losses occasioned by it. Investigations tend to show that abortion disease exists in most dairy herds in this country and is observed in beef herds, even on the range, in many parts of the United States.

The diagnosis, successful treatment and control of the diseases of swine are engaging the serious consideration of the veterinarian. According to reports there have been more outbreaks of hog cholera and more swine treated up to this time with serum and virus than for a like period in any previous year. No doubt, hog cholera is responsible for more losses of swine by death, after they are one month of age and until matured, than all other diseases combined. The complex of swine disease is gradually being unraveled. Swine erysipelas has been positively identified in this country and is apparently quite widespread. Veterinarians should familiarize themselves with the symptoms, lesions and control of this disease. Infectious necrotic enteritis and hemorrhagic septicemia are exacting their toll from the swine producer. The most extensive losses of swine so far as numbers are concerned, occurs from the time of farrowing until the pigs are about one month of age. The little pig losses are largely due to faulty breeding, improper feeding and parasitism and are all preventable. It has been demonstrated on a small scale, that swine production can be increased 50 to 80 per cent by

careful breeding, proper feeding and the provision of sanitary quarters.

The interest shown in poultry clinics at recent veterinary meetings indicates the possibilities of poultry practice. Avian tuberculosis, fowl cholera, fowl typhoid, roup and parasitism are some of the diseases that are relatively common in poultry. The intradermic tuberculin test is quite reliable in detecting tuberculous fowls but practitioners are at a loss in disposing of reactors because of the absence of any state regulations. This problem should receive the consideration of state regulatory officials.

The investigation of animal parasites has revealed much valuable information. The life cycle and methods of control of the ascarids of swine have been determined. A successful method for the treatment of sheep infested with the *Haemonchus contortus* has been revealed. It has been reported that a method for the relief of red mange in dogs has been found. The eradication of the fever tick will be realized in the not far distant future.

Deficiency diseases are apparently increasing in frequency. According to present available information, it appears justifiable to assume that the occurrence of these diseases is intimately associated with a deficiency or absence of vitamins, minerals and sunshine. These conditions are of considerable economic importance; in some instances they are difficult to identify. They should be given careful consideration.

The importance of a comprehensive knowledge of feeds and feeding can not be overestimated. Many conditions of dietary origin present a chain of symptoms so similar to those of infective diseases that they are frequently erroneously diagnosed and improperly treated. The excessive loss of colts, calves, lambs, pigs and chicks is primarily due to disturbances of digestion induced by improper diet.

Sex hygiene has been given little consideration by most veterinarians since the days of extensive horse breeding. The adoption of proper breeding methods in meat-producing animals would vastly enhance the returns to the breeder. The low vitality of young animals, especially calves, lambs and pigs, is usually directly traceable to pasture breeding or some other improper method of breeding. A greater efficiency in breeding is

one of the most important economic problems of the livestock industry.

The rewards of the purebred-sire campaign fostered by the B. A. I., will soon be forthcoming. This movement will exemplify the value of purebred sires in the economic production of a better grade of livestock. An address of this kind would not be complete without commending the activities of the B. A. I. It is not only the largest but also the most efficient organization of its kind in the world. Public service and state medicine, particularly in the last decade through the agency of the veterinarians of the B. A. I., state sanitary boards, and municipal health departments, should be given credit for developing public confidence in the veterinary profession and thus creating a greater demand for the services of the practitioner. The cooperative educational and demonstrational work on hog cholera control which was done by the Bureau of Animal Industry and various states, paved the way for the extensive swine practice of today. No doubt, the practitioners that are prepared will find an increasing demand for their services in tuberculin testing when public sentiment has been more firmly established by the cooperative testing that is now well under way.

Transportation companies in the central and western portion of the United States realizing the value of conservation of livestock have an organization of veterinarians investigating the cause of the losses of livestock in transit and suggesting improved methods to the shippers to prevent such losses.

In 1914, A. M. Palmer, who was then United States Attorney General and Alien Property Custodian, sold 4,500 chemical patents to "The Chemical Foundation," a corporation organized to encourage chemical industry in America and not for profit. This corporation was authorized to issue licenses to any competent and properly equipped American individual, firm or corporation on such of the patents as might be utilized in the promotion of American chemical industry. The value of the manufacture of dye stuffs and chemicals to American industries, to scientific and technical investigations and to all phases of the medical profession can not be overestimated. A German delegation has recently demanded the return of the patents and a revocation of the licenses issued by the Foundation to various manufacturers. From reports, it is evident that their requests

are being given consideration and it would seem timely for this association to go on record by resolution or in some other way favoring the continuation of the Chemical Foundation.

Since our last convention some of our members have completed their journey on life's highway and crossed to the Great Beyond. Proper resolutions will be presented by the Committee on Neurology in due time, paying tribute to those who have gone before.

I wish to commend the cooperation and activities of the officials, committees and individuals of the association during the past year. The success of the present meeting must be attributed to the combined action of all.

Before concluding, I wish to compliment the ladies. It is gratifying to see so many in attendance and you may rest assured that we appreciate your presence. I trust that the Fifty-ninth Annual Convention of the A. V. M. A. will be successful and that in all of our deliberations there will be good fellowship.

SOME TUBERCULOSIS HISTORY

Among the articles of important events happening thirty-five years ago, as published recently by the *Newtown (Pa.) Enterprise*, there appeared the following:

"Newton Enterprise, Newtown, Penna., June 4, 1887.—Eleven cows and a bull, belonging to C. Sidney Mather, of Middletown township, having been found to be afflicted with tuberculosis were killed in the presence of State Veterinarian Bridge, and all buried in a trench on the farm, after the hides and fat were removed. The herd was attacked with the disease about a year previous and was condemned at a meeting of neighbors, who feared the spread of the disease. The value of the cattle was appraised by Joseph Milnor, Godfrey Schaffer and Samuel M. Fite at \$250, to which amount the owner was reimbursed by the community."

That was before the days of compensation in such cases by the state.

It would thus appear that tuberculosis was diagnosed in this herd, the cattle condemned by State Veterinarian Dr. Francis Bridge and indemnity paid to the owner five years after Koch discovered the tubercle bacillus in 1882 and three years before tuberculin was first prepared.

PRELIMINARY REPORT ON EQUINE BOTULISM IN CANADA ¹

By CHARLES A. MITCHELL

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IN THE HUMAN FAMILY, especially in those continental countries where meats are sometimes consumed without being thoroughly cooked, food poisoning has long been known. No differential diagnosis was made between different kinds of food poisoning, and not until the science of bacteriology had made considerable advancement were the real causes and differences of the various types of poisoning precisely understood. In comparative medicine until recent years little or no thought was given to the poisoning of fodder by bacterial invasion and the consequent intoxication of animals eating the same. It is true that a certain set of symptoms which were found in animals and classified under a variety of names were frequently put down to be the result of eating certain fodders. More often they were thought to be the result of bacterial invasion of the brain or spinal cord.

The causative agent of botulism was first recognized by Van Ermengen (1)² in 1896. He isolated a bacillus from a ham, portions of which had been eaten by several persons. These persons had developed a neuropathic toxemia. The organism was found (though unable to produce a bacteriemia) to excrete an exceedingly potent soluble toxin. Later studies by various other workers confirmed in main the work of Ermengen. Thus from 1896 on, poisoning by *Bacillus botulinus* from meat sources has been more or less precisely recognized in human medicine.

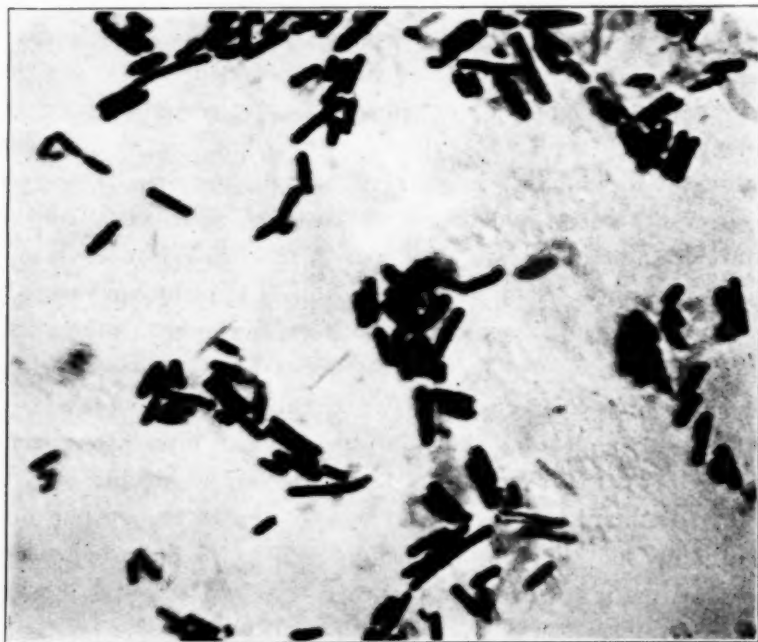
The first suggestion that botulism might occur in animals was made by Pearson (2) in 1901. He drew attention to the clinical similarity between what was known as forage poisoning in animals and that of botulism in man. No definite research work was made to prove or disprove this hypothesis of Pearson

¹ This paper is published by permission of Dr. F. Torrance, Veterinary Director General, and Dr. E. A. Watson, Chief Animal Pathologist.

² Numerals in parentheses following authors' names refer to list of literature at end of paper.

until 1916. This is not to be wondered at since at that time it was not known that *B. botulinus* would develop on foods other than meat. Also a number of investigators (to be alluded to later) had succeeded in isolating various microorganisms which were put forward as the causative agent of the set of symptoms which is variously termed forage poisoning, cerebrospinal meningitis, blind staggers, cornstalk disease and botulism. In the meantime certain observations were gradually pointing to the fact that vegetables and fodder might be the media for the growth of *B. botulinus*. Thus Wilbur and Ophuls (3) drew attention to twelve cases of botulism in human beings, which was brought about by eating canned beans. Dickson (4) in 1915 was able to show that *B. botulinus* developed on string beans.

In 1915 Buckley and Shippen (5) conducted a study of the action of *B. botulinus* on horses. They were able to produce a disease in horses which presented symptoms analogous to those of cerebrospinal meningitis and forage poisoning. A year previous to this Himmelberger (6) was able to report that a certain mold, *Monascus purpureus* (Went), which on empirical



Microphotograph of *Bacillus Botulinus*.
(Taken from smear prepared from broth culture.)

grounds had been charged with causing forage poisoning, was harmless to animals. Graham, Himmelberger and Pontius (7) were able to show that a certain particular lot of oat hay was capable of producing forage poisoning in the animals to which it was fed. In 1918, Graham, Brueckner and Pontius (8) demonstrated the presence of *B. botulinus* on certain forage that had caused intoxication in Kentucky. Moreover, they grew the bacillus on artificial media and produced the disease by the oral administration of the toxin elaborated by it.

About this time Burke (9) of California made several important contributions to the literature on this subject. He demonstrated the presence of *B. botulinus* in nature. He also accounted for several vagaries noted in connection with this organism. For example, Dickson had prepared an antitoxin against three different strains of *B. botulinus*. He found that while two strains were alike, the toxin of the third strain could not be neutralized by the antitoxins of the first two strains. Burke, carrying this work still farther, and using many strains, demonstrated that *B. botulinus* was made up of two types, which he designated type A and type B. Antitoxin made from type A will not neutralize toxin of type B, and vice versa. An interesting point in this work was the fact that type A seemed the predominant organism on the Pacific coast, whereas in eastern America type B appeared predominant.

A recent paper which has just come from the press by Nevin (10) is quite interesting from the fact that *B. botulinus* was found growing in cheese and also that the work she alludes to was done in 1914, and therefore, her strain of *B. botulinus* was the first isolated in America.

Allusion has already been made to the similarity of the symptoms presented in so-called cerebrospinal meningitis, forage poisoning and botulism. Pathological and bacteriological investigations have failed to prove that cerebrospinal meningitis is an infection of the brain or spinal cord. Siedamgrotsky and Schlegel (11) isolated a diplococcus from the brain of an infected animal. Johne (12), working about the same time, isolated a coccus from the nervous tissue of infected animals. Osertag (13) also isolated an organism which bore a resemblance to the organism isolated by Johne. Harrison (14) of Canada

isolated a different organism which he believed to be the cause of the disease.

No investigator produced clinical cerebrospinal meningitis with his organism.

In 1919 at this laboratory we isolated an organism which resembled the organism described by Ostertag, from the brain of a horse which died of what was diagnosed cerebrospinal meningitis. This organism proved nonpathogenic except in large doses. Looking back, we have no doubt that we were dealing with botulism, as there was a clear history of animals having had their feed changed to certain discarded ensilage some days before the outbreak in question. Moreover, a variety of organisms (streptococci, colon, etc.) have been isolated from brains of animals dying from dourine, swamp fever and other diseases. It is apparent that there is no conclusive evidence that cerebrospinal meningitis is caused by a microorganism gaining entrance to the central nervous system, and it seems reasonable to classify this disease (since symptoms are exactly similar) as botulism, unless some future bacteriological investigations demonstrate that it may occur as an infection separate and distinct in itself.

It would be better to drop the term "forage poisoning" when poisoning by the toxin of *B. botulinus* is meant, and to restrict its use to poisoning due to plants such as water hemlock. A great deal of unnecessary confusion in the minds of persons not following the literature closely would thereby be avoided.

BOTULISM IN CANADA

For a number of years reports have been received from private practitioners relative to outbreaks of this disease in different parts of Canada. The outbreaks were in nearly every instance confined to the one farm. Sometimes only a few horses were infected and in other cases almost the entire herd would contract the malady. From these reports which were received from time to time we are able to say that botulism has occurred in Canada for many years. At no time, however, were the losses so heavy that the disease was brought prominently before our Division, and although the losses to some individual owners were exceedingly heavy, to the country as a whole they were much less than from some of the other contagious diseases.

A RECENT OUTBREAK

In the autumn of 1921 an outbreak of so-called cerebrospinal meningitis occurred on a farm situated between Ottawa and Kingston. The location of this farm was on dry land, and the buildings were in excellent hygienic condition.

On October 12 four horses became diseased simultaneously and died in from twelve to twenty-four hours after the first symptoms were noticed. The remainder of the animals of the herd showed no evidence of disease at this time. The owner, a week later, purchased one horse and brought him to his premises. On October 27 the three remaining horses of the original herd and the one purchased became suddenly ill, presenting the same symptoms. All animals died in less than thirty hours.

Questions directed to the owner elicited the information that the eight horses had been fed from a common hay supply. Four of the animals, which were being worked, were fed oats. After October 12 the water supply was changed. It was therefore apparent that the only feed received in common by all horses was the hay. The owner stated that this fodder was cured very rapidly owing to the hot weather during haying time, but with this exception it seemed of the very best quality.

POSTMORTEM EXAMINATION

The lesions presented were in marked contrast to the severity of the symptoms. Blood was found in dark color and did not coagulate rapidly. The lungs, liver and spleen appeared normal. The heart presented a slight capillary congestion. The kidneys appeared normal, but the adrenal bodies seemed slightly congested. The circulation of the stomach and intestines was congested. On opening the cranial cavity a general engorgement of the circulation was noticed. Smears made from the blood, spinal fluid, brain, liver and spleen were examined, but no micro-organisms were found present.

The following materials were collected for laboratory examination: Samples of spinal fluid, pieces of brain, and samples of ingesta from stomach, small intestine, cecum and colon.

LABORATORY EXAMINATION AND ISOLATION OF STRAIN F

The brain was placed in a sterile vial with some sterile bead and a small amount of nutrient bouillon added. This was

shaken until the tissue was disintegrated. Small amounts of this material were transferred to tubes containing melted glucose nutrient agar. The tubes were shaken and then rapidly cooled. A layer of sterile liquid petrolatum was added to each tube to insure anaerobic conditions. Some of these tubes were incubated at 28° C. while the remainder were incubated at 37° C. No growths occurred.

The cerebrospinal fluid was cultured under conditions similar to those described above, and was found to be sterile. Cultures made aerobically revealed a few colonies of Gram-positive diplococci. Inoculated into guinea pigs this organism was nonpathogenic.

The samples from stomach, small intestines, cecum and colon were pooled and cultures made in the following manner:

Nutrient bouillon was seeded with the pooled material and incubated a few hours at 37° C. It was heated to 60° C. for a short time and then cooled. This process was repeated. The object was to destroy aerobic and facultative anaerobes as far as possible. Quantities of this material were seeded into melted agar. The tubes were gently agitated to mix the material evenly through the medium, and cooled rapidly. A layer of sterile mineral oil was added to insure anaerobic conditions. Some of the tubes were incubated at 37° C., others at 28° C.

Tubes were examined each day, and when distinct colonies were plainly defined the tubes were slightly heated and the agar transferred to Petri dishes. Each colony was carefully teased out, smears made and media inoculated. Several colonies were found to conform to description of *Bacillus botulinus*. Tubes inoculated from these colonies were incubated at 28° C. and when growth was visible, sub-cultures were made in minced meat medium.¹ This was also incubated at 28° C.

It was found that toxin was produced in the minced meat medium. After incubating the culture for fifteen days it was centrifuged until the supernatant fluid contained no bacteria. Experiments showed that 0.2 c.c. killed guinea-pigs when given intraperitoneally, and 0.4 c.c. given per os also caused death.

¹ Beef heart finely minced.....250 grams
Water250 c.c.

Heat slowly, cooking meat thoroughly; add normal soda until mixture is markedly alkaline to litmus; sterilize at 120° C. for one hour for three consecutive days.

CHARACTER OF ORGANISM

Our organism, which will from now on be called *Bacillus botulinus* F, was found to possess the following characteristics:

1. Strict anaerobe.
2. Takes Gram's stain.
3. Bacillus with rounded ends.
4. Terminal spores formed which had tendency to bulge the organism.
5. Formed short chains in liquid media.
6. Grew well at 28° C.; not so well at 37° C.
7. Produced a distinct, disagreeable, rancid odor and gas in media.
8. Produced a powerful soluble toxin which was fatal to guinea-pigs, intraperitoneally, subcutaneously or per os.

Being convinced, now, of having isolated *B. botulinus*, experiments were undertaken to determine what type of organism we were dealing with. Antitoxins against type A and also against type B were obtained through the courtesy of the Bureau of Animal Industry, U. S. A. Toxin was produced by growing our organism in minced meat and its M. L. D. determined to be 0.2 c.c. The antitoxin was mixed with the toxin and incubated for 30 minutes at 37° C. Table 1 illustrates the procedure and results.

TABLE 1.—INOCULATION TESTS OF ORGANISMS.

M.L.D. toxin	Amount of antitoxin	Inoculated into—	Result
F. 0.2 c.c.	O, incubated at 37° C. for ½ hour	2 guinea-pigs	2 deaths
F. 0.2 c.c.	Antitoxin B, 2 c.c., incubated at 37° C. for ½ hour	2 guinea-pigs	No deaths
F. 0.2 c.c.	Antitoxin A, 2 c.c., incubated at 37° C. for ½ hour	2 guinea-pigs	2 deaths

It will be noted from the results that type B antitoxin protected animals against toxin of *B. botulinus* F, so that the strain isolated was *B. botulinus* type B.

EFFECT OF TOXIN ON HORSES

A culture of *B. botulinus* was grown at 28° C. for sixteen days in minced meat medium. The culture was centrifuged one hour to throw down the bacilli. The supernatant fluid removed and examined under the microscope revealed no bacilli. Five

cubic centimeters of this germ-free toxin was given to a horse orally on the evening of January 10.

For three days he remained quite healthy. On the fourth day he was found to have extreme difficulty in swallowing and the muscles of deglutition became totally paralyzed. Salivation was very profuse; pupils were enlarged, and there was loss of the power of accommodation. Later ptosis developed. Extreme muscular weakness came on, and the animal became decumbent eight hours after first symptoms were noticed. No sensory paralysis was found at any time. Temperature remained normal, becoming subnormal shortly before death. Pulse and respirations did not vary much from normal until just before death.

Postmortem examination showed the brain to be extremely congested. Only the head was examined. Smears made from different regions of the brain revealed no organisms, and guinea-pig inoculations were negative.

Horse No. 2, an old horse badly affected with "heaves," was fed 5 c.c. of filtered toxin on oats. Curiously enough, after about twelve hours his breathing difficulty ceased. This was possibly due to a partially paralyzing action of the toxin upon the higher respiratory centers. The animal did not manifest any decided symptoms until the third day, when he suddenly collapsed and died in a short time.

Postmortem examination did not reveal any very marked pathological changes. Capillary congestion of the heart, lung and abdominal viscera were the most outstanding of the changes

noted.

AFFINITY OF TOXIN FOR BRAIN TISSUE

It is known that the toxin produced by *Bacillus tetani* has a definite affinity for nerve cells, and when once anchored to these cells the union seems to be of a permanent nature.

Since the clinical symptoms indicate that there may be an affinity between certain portions of nervous tissue and the toxin of *B. botulinus*, experiments were undertaken to determine if this union took place in vitro as it does in the case of tetanus antitoxin.

The brain was removed from a healthy guinea-pig which was killed for the purpose. It was weighed and macerated with two and one-half times its weight of normal saline, and the experiments shown in Table 2 were performed.

TABLE 2.—EXPERIMENT TO TEST AFFINITY OF BOTULINUS TOXIN FOR BRAIN TISSUE.

M.L.D. toxin	Brain tissue emulsion	Incubated at 37° C.	Inoculated into—	Death in—
0.1 c.c. toxin	1 c.c.	5 hours	1 g.-pig	12 hours
0.2 c.c. toxin	1 c.c.	5 hours	1 g.-pig	12 hours
0.1 c.c. toxin	5 hours	1 g.-pig	12 hours
	1 c.c.	5 hours	1 g.-pig	Alive

The results do not indicate that *B. botulinus* toxin becomes fixed in vitro, at least with a sensitization period of five hours.

TOXIN PRECIPITATION

Five cubic centimeters of toxin was slowly dropped into 100 c.c. of 95 per cent alcohol. A brownish precipitate formed which settled to the bottom. It was allowed to settle overnight, and in the morning the alcohol was poured off and the residue allowed to dry in the incubator. A gummy brownish substance resulted. To this twenty times its weight of distilled water was added, and 0.1 c.c. of the mixture was given to two guinea-pigs, one orally, the other subcutaneously. Both pigs died in about twelve hours.

The toxin may, therefore, be precipitated in the presence of alcohol. This might be a useful manner to purify the toxin from other proteins for antitoxin work.

TOXIN B. BOTULINUS F—EFFECTS ON CHICKENS

We found chickens immune to our toxin from *Bacillus botulinus* F, even in massive doses. Ten cubic centimeters of toxin was fed to six small chickens. These animals remained quite well. They were taken out of the cage, and two guinea-pigs were placed in the same cage and fed so that their food came in contact with the excreta from the chickens. On the third day both pigs died.

It is clear that the toxin passed through the alimentary tract of the chicken unchanged.

IS TOXIN ABSORBED AND STORED IN THE EGG?

A laying hen was fed 3 c.c. of toxin and her eggs were collected for eighteen days, during which time seven eggs were laid.

The experiment was conducted as follows: One egg was shaken with beads until emulsified. It was then divided into two equal portions and a guinea-pig inoculated intraperitoneally with one portion, while the other half was forced-fed to a second

guinea-pig. This was repeated with the remaining six eggs, and none of these showed any evidence of containing toxin.

This is of special importance to invalids and children, as it is readily understood that if the toxin were absorbed and deposited in the egg it might become a source of danger to those eating eggs in the raw state.

PRODUCTION OF TOXIN IN VEGETABLE MEDIA

Horses being herbivorous animals, it is apparent that the main source of toxin must be from the growth of *Bacillus botulinus* in a fodder medium. To test the production of toxins in this manner, the following medium was made up: Oats were sprouted until the sprouts were about 4 inches long. These sprouts were clipped off, thoroughly washed under sterile distilled water, and were then placed in sterile large glass test tubes and packed firmly with a glass rod until the liquid expressed from the green oats covered the surface of the pulp. Several tubes were then inoculated with a loopful of *B. botulinus*. The surface of each test tube was covered with sterile liquid petrolatum. They were incubated at 28° C. for ten days.

Smears were then made from the inoculated tubes and from control tubes. In the inoculated tubes *B. botulinus* was found, also some molds and yeasts. In the control tubes only molds and yeasts were found. Some of the liquid was drawn off from each tube and centrifuged and fed to guinea-pigs in varying amounts. The liquid from control tubes was found to have no effect on guinea-pigs. The liquid from inoculated tubes was found to cause a fatal illness in guinea-pigs in doses of 0.5 c.c.

This clearly indicates that *B. botulinus* may grow in fodder and produce its toxin. Clinical experience would rather indicate that not the whole mow full of hay is infected, but that the bacillus grows here and there, producing pockets of infective material. When the hay from one of these pockets is removed and fed, the illness is set up and only the animals receiving fodder from these local areas are infected. The herd will remain quite healthy until another pocket is fed, when the illness will again appear.

SUMMARY

1. *Bacillus botulinus*, type B, was inoculated from the ingesta of horses suffering from so-called cerebrospinal meningitis in Canada.

2. This organism produced a toxin which, freed from the bacilli, produced botulism in experimental animals.

3. This toxin does not become stably fixed to healthy nerve tissue in vitro when incubated together at 37° C. for a period of five hours.

4. Toxin may be precipitated in 95 per cent alcohol without loss of activity.

5. The toxin of type B is not absorbed from the alimentary tract of chickens and stored in the egg content.

6. *Bacillus botulinus* may be grown on vegetable media to produce a toxin which, in very small doses, is capable of causing fatal poisoning when fed to susceptible animals.

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The British Minister of Health has prepared an outline of a proposed uniform system of local meat inspection which he has recommended to the local authorities for adoption.

Wallaces' *Farmer* refers to B. A. I. service work and states: "It is encouraging to know that scientific students of heredity are now beginning to work with domestic animals instead of confining their attention solely to rabbits and guinea pigs."

IMPACTION AND ATONY OF THE RUMEN: ETIOLOGY AND TREATMENT¹

By LOUIS A. KLEIN

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IN THE HORSE the intestines, and especially the large colon, are more frequently affected by disease than the stomach, but in cattle the gastric compartments are more often deranged than the intestines. This is no doubt due to the fact that these two divisions of the digestive tract, although differing greatly in structure and location in the two species, possess certain similarities in function. Both the large colon in the horse and the rumen in cattle act as reservoirs for the greater portion of the alimentary matter in the digestive tract, and in each case the material present is subjected to a bacterial fermentation which breaks down the cellulose envelopes in which the nutritive substances in the food of herbivora are enclosed, rendering them more accessible to the action of the digestive fluids.

Of the four stomachs of cattle, the rumen is more frequently deranged than any of the others. This is due to its situation, it being so placed that it is the first to suffer from errors of diet. The fact that its activities are necessary to help put food in proper condition to be received and acted upon by the other gastric compartments makes its proper functioning of prime importance in the process of digestion. Derangements of the rumen are nearly always due to functional disturbance and not to organic lesions. This being the case, it is necessary to understand the physiology of the rumen in order to comprehend properly the departures from the normal to which it is subject and to be able to apply rational therapeutic measures for their relief.

In feeding, bovines take food into the mouth hurriedly and, after crushing it between the teeth by a few motions of the jaws, form it into a bolus with the tongue and swallow it. During its short stay in the mouth a liberal quantity of saliva is mixed with it. When swallowed, it passes into the rumen and reticu-

¹ Presented at the semi-annual meeting of the Maryland Veterinary Medical Association held at the University of Maryland, College Park, July 20 and 21, 1922.

lum, where it may remain several days. The excess fluids gravitate to the reticulum, while the solids collect in the rumen in a moist condition. The rumen is therefore a reservoir where food is temporarily stored to be prepared for the action of the other parts of the digestive tract. While here it is macerated and softened by the saliva which is swallowed. The secretion of saliva is more or less constant in bovines and is an important adjunct to the proper functioning of the rumen and also of the omasum. A cow on dry feed secretes 50 to 60 quarts of saliva in 24 hours. In many diseases, especially those of a febrile type, the secretion of saliva is usually decreased or suppressed in common with the other secretions. This is indicated by a dry condition of the mouth.

After arriving in the rumen, the food is moved about and mixed by the contraction of the walls of that organ. There is some digestion of starches and proteins by the enzymes in the food, and fats are liberated from inclosing substances by agents of the same character, but these actions are not important. It is doubtful if there is any digestion of starches by the saliva, as it is believed to contain little if any ptyalin. The principal action in the digestive processes which take place in the rumen is the destructive fermentation of cellulose set up by bacteria swallowed with the food. By this action, the envelopes surrounding the nutritive substances in the food are broken down and the nutrients set free so that they may be exposed to the digestive ferments in the succeeding parts of the digestive tract. This bacterial fermentation is attended with the production of acids, gases and other substances, just as occurs in the large colon of the horse. The gases do not collect in the rumen in any considerable quantity under normal conditions, because they are eructated, especially during feeding and rumination.

While food in solid form passes directly to the rumen when swallowed the first time, water and other fluids for the most part pass through the omasum (third stomach) and obomasum (fourth stomach) directly to the duodenum, only a small portion going to the rumen and reticulum. The same is true of medicines when administered by the mouth, their destination depending upon whether they are given in solid form or in solution. It is important to keep this fact in mind in prescribing for cattle. If an action is desired which can be obtained only

after the drug is absorbed into the blood, then it should be given in solution so that the greater portion will pass directly to the duodenum, where it will be absorbed. There is no absorption in the first three stomachs. When digitalis is given in the form of powdered leaves, it passes to the rumen and the maceration to which it is there subjected destroys the active principles; consequently, when the drug is given to cattle in this manner no action upon the circulation is obtained. It is probable that there are other drugs which are affected in the same manner, but we have no definite knowledge on this point. If it is desired to introduce an antiseptic solution into the rumen to prevent fermentation and putrefaction, as in acute tympany, the solution will be most certain to reach the place where its action is needed if it is injected into the rumen through a canula inserted in the left flank. Formaldehyde solution or formalin are the best preparations for this purpose (one tablespoonful in a quart of water).

At certain periods, which occur at intervals during each 24 hours, the food in the rumen is carried up into the mouth in small portions and thoroughly masticated. As the chewing of each bolus of food is completed it is swallowed and passes to the omasum (third stomach), then another is immediately brought up from the rumen and the process is repeated. This is rumination. If we are to understand how and by what means this function may be disturbed it is essential to know the conditions which are required for its proper performance. These will therefore be briefly considered.

The act is purely voluntary. It is performed only when the animal is perfectly at ease in quiet surroundings. Certain other conditions are required. The rumen must be about half full and a certain quantity of fluid must be present in the rumen and reticulum. These conditions existing, the contraction of the walls of the rumen and reticulum, and the compression exerted upon these organs by the contraction of the inferior abdominal wall with the diaphragm fixed, then forces the contents of the rumen against the pillars of the esophagus. The latter draw together and separate from the mass a small portion of food, which is carried upward to the mouth by reverse peristalsis of the esophagus.

Upon the arrival of the food in the mouth, the excess fluid is squeezed out and swallowed and the remaining portion, after

being thoroughly masticated, is again swallowed and passes to the omasum (third stomach), the pillars of the esophagus closing and directing it to that gastric compartment. Here it is pressed between the leaf-like extensions of the mucous membrane, and the fluid which is squeezed out passes over to the abomasum (fourth stomach), while the part which remains in the omasum is subjected to further grinding between the leaves and when reduced to a state of fine division filters into the abomasum. In the abomasum (fourth stomach) the same digestive processes take place as occur in the stomach of the horse, there being an amylolytic and a peptic stage. The abomasum is the only true stomach; the other three compartments, although usually called stomachs, being really esophageal pouches, corresponding to the crop and gizzard of the chicken. Adult cattle find it necessary to devote 6 to 7 hours in each 24 to rumination. When two feeds are given daily, as is usual, there are about three periods of rumination in each interval between meals.

The absence of any of the external or internal conditions mentioned as requisite for rumination, or the failure of any of the organs or parts concerned in the process to function properly, will modify or suppress rumination. Any unusual condition or occurrence which disturbs the animal will cause it to stop ruminating temporarily, and if the condition is repeated at short intervals or continues to operate digestion will eventually be affected.

Since the contents of the rumen must have a certain volume for rumination to occur, the feed of cattle must be to some extent bulky. Therefore a certain quantity of roughage is necessary to their well-being. This explains why rumination is suspended when an insufficient quantity of roughage is fed.

A certain quantity of fluid being necessary for rumination, a sudden change from green to dry feed, a large feed of unusually dry fodder, or the exclusive feeding of very dry fodder with insufficient water will make it impossible for the act to be performed. An abundant supply of water is necessary at all times. Suppression of the secretion of saliva will also interfere with rumination by reducing the quantity of fluid in the rumen.

Weakness or paralysis of the muscular layer in the wall of the rumen will modify or entirely suppress rumination. This is the condition which is most frequently the cause of disturbance of

rumination in cows on dairy farms where intensive methods of milk production are in operation. Weakness or atony of the musculature of the rumen may result from a number of causes, among the most common being continued heavy feeding for high milk production, insufficient exercise, especially when accompanied by stabling in hot, poorly-ventilated stables; also exposure to cold winds and rains. Fresh cows for two or three weeks after calving, and animals which are weak from insufficient feed or from the effects of previously existing disease, are especially susceptible to these causes. Paralysis of the muscle in the wall of the rumen may be caused by giving a large quantity of ice-cold drinking water to an animal confined in a stall. The same kind of water will not be injurious, however, if the animal is required to walk to and from a stream or water-trough.

Rumination may be suspended for a longer or shorter period or it may be carried on in a feeble manner, the time devoted to chewing each bolus being shortened and the interval between the swallowing of one bolus and the rising of another being greater than normal. Imperfect rumination is often the first sign that the rumen is not functioning properly, and if it is unheeded and full feeding continued, impaction usually follows.

Any condition which interferes with rumination will lead to impaction of the rumen, and this in turn may be followed or accompanied by tympanites, impaction of the omasum (third stomach), or catarrh or inflammation of the abomasum (fourth stomach) and intestines. When impaction results from feeding a large quantity of unusually dry fodder or from the rumen being overloaded, as occurs when a cow breaks into a feed bin, it is sudden and pronounced; but when other causes are operating, especially those which produce an atony or weakening of the musculature of the rumen, the impaction occurs gradually and is always of a lesser degree. Cases of the latter type are more often seen on dairy farms where intensive methods of milk production are followed than on general farms. At first the only symptoms of disease apparent are cessation of rumination and loss of appetite, but auscultation will reveal that the wall of the rumen is not contracting in the usual manner, and on palpation it will usually be found that the rumen is fuller than ordinary and that the contents are firmer. There is often a decrease in the milk flow. If the animal is induced to eat by offering it

various tempting feeds the condition will be aggravated and recovery delayed, whereas proper treatment at this time will restore conditions to normal in a short time.

The treatment of impaction should be directed to restoring the functional activity of the rumen. This can be done by providing, in so far as is possible, the conditions which are necessary for rumination. If the contents of the rumen are dry and firm, water to soften the mass can be introduced by means of an esophageal sound or through a canula inserted in the left flank. If the secretion of saliva is scanty, it may be stimulated with potassium chlorate (2 to 6 drams) or, if the cost is not prohibitive, pilocarpin (3 to 5 grains). The musculature of the rumen may be stimulated by means of drugs and also by massage, liniments and exercise. The drugs which may be used for this purpose are tartar emetic ($2\frac{1}{2}$ to 5 dr.), alcohol (1 to $1\frac{1}{2}$ oz.), oil of turpentine (1 to $1\frac{1}{2}$ oz.), carbonate of ammonia ($\frac{1}{2}$ to 1 oz.), water of ammonia ($\frac{1}{2}$ to 1 oz.), ipecac (1 to $2\frac{1}{2}$ dr.), colchicum (tinc., 1 oz.), veratrin ($1\frac{1}{2}$ to 3 grains), eserine ($1\frac{1}{2}$ to 3 grains), and arecolin ($\frac{1}{4}$ grain). Eserine and arecolin exert a direct stimulant action on the muscle of the rumen after being absorbed by the blood and may therefore be given hypodermically as well as by the mouth. How the other drugs mentioned produce their ruminative effect is not positively known. It has been demonstrated that the irritant action of alcohol, oil of turpentine and veratrin on the mucous membrane of the duodenum causes the wall of the stomach in monogastric animals to contract, and it is known that the nerve supply of the duodenum and the first, second and fourth stomachs in cattle corresponds to that of the stomach and intestines in monogastric animals. These facts would indicate that the drugs under discussion stimulate the muscle in the wall of the rumen reflexly by irritating the sensory nerve terminations in the mucous membrane of the duodenum. They should therefore be given in solution by the mouth.

Epsom salts is frequently given to relieve impaction of the rumen, but it does not always operate satisfactorily. Cases have been observed in which the animal was purging from this drug while the rumen remained impacted and the wall was inactive. When tartar emetic was administered the wall of the rumen began to contract and the impaction was overcome. If the saline

purge is repeated in such cases it may only have the effect of irritating the abomasum (fourth stomach) and the small intestines, setting up a gastrointestinal catarrh or gastroenteritis. In pronounced or extensive impaction it is advisable, however, to give a pound of Epsom salts with the first dose of a ruminatoric, to help to clear a way through the intestines, but the salts should not be repeated.

Tartar emetic is one of the best ruminatorics, but the depressant action on the heart and blood vessels produced by large quantities may cause collapse, and therefore, if it is necessary to continue stimulation of the rumen after three or four doses have been given, it is advisable to change to one of the ammonia preparations or one of the other ruminatorics. Caffein, by increasing reflex activity, renders the rumen more susceptible to the action of the ruminatorics which act through the duodenum. It is also a heart stimulant, which makes it especially suitable as a synergist to tartar emetic. Caffein is most economically administered to cattle in the form of coffee, a quart of good, strong coffee being given twice daily. Coffee also contains tannic acid, and as tartar emetic is incompatible with this substance, the two must be given separately an hour or two apart. The dose of tartar emetic should be given dissolved in a quart of water, and in preparing this drench hard water should be avoided, as the alkaline carbonates it contains decompose tartar emetic. Despite the conditions which must be observed in using it, tartar emetic is probably the most satisfactory ruminatoric we have. In those incipient cases of impaction in which the only apparent symptoms are cessation of rumination and loss of appetite, three or four doses of tartar emetic ($2\frac{1}{2}$ drams three times a day) are usually all that is required to get the cow back to normal.

Vigorous massage will assist in restoring activity to the walls of an inert rumen. This is applied by kneading the rumen through the walls of the left flank with the fist. Exercise is also of assistance, especially in those cows which are continually confined in hot, stuffy stables. Cutaneous irritation by liniments has the effect of stimulating gastric and intestinal peristalsis reflexly.

When movement has been established in the wall of the rumen and the impaction removed, stomachics should be administered and the other treatment suspended.

In those cases which for various reasons may not respond to the above treatment, rumenotomy must be resorted to.

BOVINE STERILITY AND ITS TREATMENT¹

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IN DISCUSSING this subject we shall not attempt to tell anything new. We shall refrain also from rewriting and rehashing the volumes of reports that have been written upon experimental work. Neither has it seemed necessary to go into the detailed anatomy of the parts concerned, as these facts are a matter of textbook record. So the thought—and we hope the happy thought—occurred to us that we present the subject of abortion disease from our own viewpoint, as we have found it in our own territory in Idaho, along with the methods we have used for its control. Not that these reports and methods are unusual, radical or new, but rather that they are actual local conditions which we think are typical, and the methods we consider practical.

The conditions alluded to are many and varied. However, they are constant enough, we believe, to constitute a definite disease, which we have chosen to call abortion disease. It seems also that this nomenclature is being generally adopted by the profession.

Abortion disease is a subacute and more often chronic disease of the generative organs of the bovine and perhaps other species of animals. It is manifest by premature expulsion of the fetus, retained placenta, metritis, mastitis, sterility, and certain diseases of the new-born. It is caused by infections of the reproductive organs. The primary infection is quite generally conceded to be the bacillus of Bang. However, some investigators seem to show that many other organisms, especially the pus-producing ones, enter into the field and at times seem to be the primary and only infections present. A vibrio has been isolated and blamed by some as the cause. Whatever the causative factor or factors may be, it is generally acknowledged that the disease is transmissible from one animal to another, the main source of infection seeming to be through the digestive tract on contaminated feed. We can not concede that this is the only source of

¹ Presented at the second annual meeting of the Idaho Veterinary Medical Association, Boise, Idaho, May 11, 1922.

infection, however, and consider the bull a factor in transmitting the disease from one cow to another, and possibly a carrier of infection within himself. This we will take up more in detail when discussing the bull.

The disease is quite generally distributed in our territory, and reports seem to indicate that it is as prevalent in other States as in Idaho. The yearly losses from this disease in milk production and in calves are variously estimated by different authorities. Hadley of Wisconsin estimates an annual loss of \$3,637,000 in that State alone. We are not going to make an estimate for the State of Idaho except to say that we consider 20 per cent of the cows in our territory to be actively infected at the present time.

The reproductive organs of the cow consist of the vagina, cervix, uterus, Fallopian tubes, and ovaries, also the mammary glands, each of which must be in a healthy, noninfected and vigorous state and functioning properly before pregnancy can take place and be carried to a successful termination. A diseased condition of any one or more of these organs will produce either sterility or abortion or both. It seems to us that the first essential in the study of this work is to gain a thorough knowledge of the normal organs, for if the normal and healthy is not understood, how can one expect to recognize the pathological? In this part of the work we have been greatly benefited from specimens furnished by our local abattoirs.

Owing to the fact that each one of the above-mentioned organs has a definite function to perform in the cycle of reproduction, and that these functions are each distinct, yet all leading to the same end, the symptoms are varied according to the organs affected; still the one outstanding symptom is always the failure to reproduce normally. Since such a variety of causes can bring about the same general symptom, we think it quite essential to make a thorough examination of each animal and to have the most accurate record possible of each individual, not only as to the condition at the time of examination, but all the reliable history that can be obtained. A record should be made of this and preserved and studied so that a correct diagnosis can be made and proper treatment applied to each individual case. We believe that we can illustrate best by giving

you a few reports of herds that have been under our supervision for some time.

Herd No. 1.—In May, 1920, we undertook the supervision and treatment of a herd of purebred dairy cattle, and found the following conditions present: There was at that time only one calf on the farm that was less than six months old. Every cow and most of the virgin heifers had a purulent discharge from the vulva. The general condition of the herd was unthrifty.

We carefully examined 32 of the mature cows and found 15 pregnant, 3 with pyometra and the remaining 14 sterile. The most common lesions found in the sterile cows was a cervicitis and a granular purulent vaginitis, with one, an old cow, showing also a tubular trouble and an atrophy of the ovary on the right side.

The owner was positive that there had never been an abortion in this herd. However, upon close examination of his breeding records it was found that several cows had passed over periods of from two to four months without showing estrum, then had come in quite regularly thereafter, and finally he remembered one heifer that had had a very small string of material hanging from the vulva one morning, and that this same heifer had come in heat a few days later for the first time in three and one-half months. However, we did not consider the "slinking of the calf" was the big problem in this herd, but rather the sterility phase of disease.

The general outline of treatment was to clean up and keep clean. So daily irrigations of all cows and heifers were directed. A 1 per cent cresol solution at body temperature was used. Weekly examinations of all unbred animals were made. During these examinations such treatment of uterus and ovaries was given as seemed advisable; atonic uteruses were massaged, cystic and retained corpora lutea were taken care of, and stubborn cases of cervicitis treated. After about two months of such treatment the purulent discharge from practically all the cows had subsided and the general condition of the herd had improved. Instructions were then given to breed all clean cows. A young and clean bull was used, and pregnancies began to result.

Of the 8 virgin heifers in this herd, all showing the same vaginal symptoms as the cows and treated the same, 5 conceived on

the first breeding, 2 conceived after 3 services each, and one has never conceived.

Of the 14 sterile cows, two never did "settle in calf," one of them showing a cicatricial cervix and the other developed a slight pyometra which did not respond to treatment. Both were sold to the butcher. The other 12 cows have all conceived, and those whose time is up have given birth to healthy calves.

Of the 15 pregnant cows at the time of the first examination, each has given birth to a normal calf. There has not been a retained placenta. One case of pyometra has developed and some calf scours has prevailed. It has been our policy to have each cow irrigated daily for a time after calving, as this seems to aid materially in getting them to conceive later on.

In December, about seven months after we had undertaken the treatment of this herd, it was noticed that pregnancies were not taking place as constantly as in the previous months, and a little of the purulent discharge was reappearing from some of the cows; so another herd examination was made to determine the reason, if possible, for the apparent sterilities. At this time the early pregnancies were diagnosed and made note of, as well as other findings. In summing up the records after the examination it was noted that the reappearance of the old cervicitis and vaginitis were the prevailing symptoms in the cows that were failing to breed. After a period of vaginal irrigations, pregnancies were still not as numerous as they should have been, although the cows had responded well to the treatment. So the bull was examined and found to be at fault. He will be discussed later. In March three abortions had occurred at two to three months of gestation. Two of these were diagnosed by rectal examinations before and after aborting, and one was observed by the owner. It was then noted that these abortions occurred in the last three cows to conceive to this bull. There has not been time enough since changing sires to say definitely how rapidly conceptions have taken place since this last misfortune.

Of the four cases of pyometra occurring in this herd, three at the time treatment was undertaken and one since, two have been sold to slaughter as hopeless and the other two are ready to breed. So in summing up the results of work on this herd in

terms of percentages for production, we have the following showing:

At the time treatment was started milk production was about 40 per cent of normal, and calf production was about 35 per cent, or the herd was not paying for its hay. There have been lost as hopeless to treat 4 cows and 2 bulls. At present the production stands about as follows: Milk production, 85 per cent; living calves, 60 per cent; pregnancies, 20 per cent; cows not bred, 5 per cent. Or the herd is now running about 20 per cent below normal in calf and milk production. We think this is an illustration of what can be accomplished by sanitation and herd supervision.

Herd No. 2.—This is a herd of purebred beef type cattle, and we find conditions somewhat different, although the same general complaint; that is, the lack of production was the dominant factor in the mind of the owner. Supervision of this herd was started about six months ago. There are 30 cows and 3 bulls under treatment, or have been under treatment during this time.

A summary of the history runs about as follows:

Fourteen of the cows were thought to be in calf at the time they were sent to pasture in May, 1921, and were not known to come in heat until early fall and winter, and showed estrum quite regularly but failed to conceive. Ten cows had given birth to healthy calves during the summer, but failed to breed. Four were virgin heifers that refused to get in calf, and two were cows that had failed to breed the previous year. To the owner's knowledge there had not been an abortion in the herd. There was no visible discharge from any animal.

Careful examinations by vagina and rectum revealed a cervicitis quite constant and generally an atonic condition of the uteruses, with some minor ovarian troubles. Three cases showed a slight purulent discharge from the uterus at the second and third treatments by massage. All the cows under treatment were isolated and given hot saline irrigations daily by the owner, and we saw and treated them at intervals of about ten days or two weeks. These treatments consisted of uterine massage where indicated, and uterine douches with 1 per cent Lugol's solution where an infection of the uterus indicated it. Also these examinations served to determine the progress of each animal, and when one was found that seemed clean and vigorous the fact

was noted on her record and she was turned out with the healthy cows and bred.

During this time it has been possible for us to diagnose three abortions in this herd by finding the cows pregnant at six to ten weeks and then finding the uterus empty. So again it is difficult to say which phase of the disease is mostly to blame for the breeding trouble, whether it is sterility or abortion or both, and where to say the one quits and the other begins. Nevertheless, a summary of the conditions in this herd on April 15 runs something like this: Three unseen abortions have occurred in cows that have gotten pregnant after being treated. Two cows that had not been treated have retained their placentaë, after normal calves, and have been treated accordingly.

There are 16 pregnant cows now, and 10 not yet ready to breed; also four that seem to be really sterile. Of these four, one is a virgin heifer whose cervix is occluded by scar tissue. One is an old cow showing nothing but a long almost lifeless uterus that does not respond to massage, but as yet has no pus in it. The other two show tubular trouble and are probably hopeless.

We hope that the reporting of these two herds will serve the purpose of this paper so far as the female of the species is concerned, and beg now to call attention to the influence that the bull may have on abortion disease.

In our "good old college days" we were taught that the bull is one-half of the herd, and to our knowledge this statement has never been seriously disputed by authorities on the subject but is acknowledged as a fact. Since the sire is one-half of the herd from a breeding standpoint, why overlook him as a factor in the transmission of the diseases of the reproductive organs?

The organs entering into the field of reproduction in the bull are the sheath, penis, testicles, epididymis, seminal vesicles, prostate and Cowper's glands, each of which must be in a healthy and normal state in order to produce a viable semen.

Unfortunately not all of these organs are accessible for manual examination as readily as the genital organs of the female are. However, the testicles, epididymis, cord and penis with its sheath are quite easily examined, so it is therefore possible to recognize many of the gross changes that take place in them from diseased conditions. The prostate and Cowper's glands

are so hidden in the pelvic cavity that physical examination of them reveals very little unless they are greatly enlarged. Hence the examination of the bull usually consists of the palpation of the testicles, epididymis and penis and observation of the sheath. The finding of any one or more of these organs affected warrants the withdrawal of the bull from service until such time as the condition is corrected. Failing to find lesions on such an examination, however, does not warrant one in concluding that the animal is healthy and fit for use, for it is very possible for an infection that would destroy fertility to exist in one of the organs not palpated, or even in one of those examined, and that infection not to be developed far enough to cause a gross lesion. Hence the surest and most satisfactory way to determine the potency of the bull, we think, is to examine the semen, for it is the vital product and the one necessary thing so far as the bull is concerned to produce a proper fecundation of the ovum. So any change from the normal should be regarded as sufficient reason for the lack of potency, the degree of impotency depending somewhat upon the amount of divergence from the normal.

We have alluded to a pathological condition found in a bull in herd No. 1, and wish to report this case more in detail. This animal was put into use in June, 1921. A clinical examination at that time revealed only the normal. He had been used on a few heifers previously, and pregnancies had resulted, so he was considered clean. As stated before, conceptions began to take place as soon as this animal was used on cows that had responded to treatment. This continued for about five months, when again our records began to show a few nonbreeders among the cows. A little later some abortions occurred at about the third to fourth month of gestation. Then the bull was suspected, although he did not show any abnormal condition upon clinical examination. So two samples of semen were taken from two services a few minutes apart. The first sample from gross appearance seemed to be nearly all pus, and the second one looked to be about one-third pus. Microscopic examination was made at once of the second sample to determine the motility of the sperm cells. This showed about 20 per cent of them not motile. A laboratory examination was made in two hours after the samples were taken with the following results:

20 per cent of the sperm cells were still motile.

10 per cent were imperfectly formed, including small heads, no nucleus, short or curved tails.

3 per cent degenerated heads, making a Y-shaped cell.

1 per cent headless tails and

$\frac{1}{2}$ per cent tailless heads.

Bacterial examination showed in the first sample numerous *Bacillus coli* and about one-fourth as many streptococcus. The second sample showed a few colon bacilli and numerous *Streptococcus pyogenes aureus*.

A sample of the vaginal secretions of the cow used in this work was taken before she was washed for the service, and a laboratory examination of this showed a few *B. coli* and numerous small micrococci, which did not develop in the incubator.

So we conclude that this bull was ejaculating real pus of a virulent nature and very likely is hopeless as far as future breeding is concerned.

The case just reported is the most outstanding example in our experience. However, we have discarded several other bulls from herds under our supervision. On clinical evidence of disease, one in herd No. 2 was taken from service, when on examination the epididymis was found to be hard and enlarged. Another in a herd not reported in this paper was discarded on the grounds of old age and a pus discharge from the sheath. However, we do not deem it sufficient merely to discard one bull and replace him with one that looks clean, but recommend so far as possible the frequent examination of the semen of a bull used where breeding troubles exist. By this method we think it possible to detect the early appearance of infection in the bull and by so doing avoid much trouble that otherwise might occur.

The foregoing reports are believed to be sufficient to give a general idea of the conditions found in the average herds that have been brought to our attention, so instead of presenting further case reports we will attempt to outline a method of treatment which we believe if followed for a sufficient time will give definite results in the control of the diseases of the reproductive organs of the bovine.

There is, we believe, no panacea for the cure of any or all of the conditions associated with abortion disease. However, it is possible, by a definite program of cleanliness, sanitation and prevention, conscientiously carried out, to prevent, control

and even suppress the disease and maintain a herd of breeding or dairy cattle on an efficient production basis.

So long as the causes of this disease are still being sought, the problem of eradication is a difficult one indeed. Therefore it seems to be rather an economic problem for each individual herd; hence a method of herd supervision seems the logical solution. It has been our plan to make a careful and thorough examination of each individual, and to preserve a record of the findings along with her history; then to classify the animal as to condition and treat accordingly.

Those showing cervicitis, vaginitis or pyometra are daily irrigated with hot saline solution. Atonic and septic uteruses are irrigated and massaged at intervals of one to two weeks, as their progress indicates. Diseased ovaries are treated according to indications, and of course those individuals not considered amenable to treatment are culled from the herd.

Too much stress can not be placed on an accurate record of each individual, which includes her former history, as well as the conditions found at each examination, and her oestral dates. Thus one is able to follow accurately the progress or lack of progress she is making and to know what condition to expect in the ovary and uterus, if they are normal on the date of successive examinations.

We believe there is danger of overtreatment, especially of the ovaries. However, by carefully watching each animal and not breeding until she has a healthy, noninfected uterus, and then breeding to a healthy, noninfected bull, we are then, and then only, entitled to expect to get a normal, vigorous offspring.

We wish to acknowledge the valuable assistance given us by E. R. Dooley, bacteriologist, of Twin Falls, who did all of the laboratory work reported in this paper.

Country Gentleman, in a leading article on tick eradication, says: "And today the real problem facing State and Federal authorities is not the annihilation of the cattle tick, but the winning over of that 1 per cent of people who can, if they will, keep the red stains on the quarantine map well-nigh indefinitely."

TECHNIQUE OF TUBERCULIN TESTING ¹

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MOST DISCUSSIONS of tuberculin tests are confined to efficiency of results rather than the importance of uniform technique.

The tuberculin test is a scientific operation, depending for efficiency upon careful technique and interpretation and the closest observation of the animals. It is not a mechanical process by which any one who can make a hypodermic injection or read a thermometer can obtain satisfactory results.

THE VETERINARIAN

The veterinarian is an important factor in tuberculosis control work. He must be familiar with all phases of tuberculosis, its cause, its nature. He must know something of the pathology, and what kind of lesions are produced, in what part of the animal's body the lesions may be located, through what channels the organism is likely to enter and to be discharged. He should also be able to recognize the physical symptoms of the disease, as well as the manner of spread, and understand the best preventive measures for combating it. With these facts, and having a thorough knowledge of the application of the tuberculin test, he is qualified to use this test as a method of control in freeing infected herds from the disease.

TUBERCULIN TESTS

The three tuberculin tests generally recognized are the subcutaneous, the ophthalmic, and the intradermal, the intrapalpreal being considered an intradermal test.

GENERAL INSTRUCTIONS

When a tuberculin test is to be made, the owner of the cattle should be notified several days in advance of the time set for the test on his herd, and requested to have his cattle stabled a few hours prior to the time the veterinarian will arrive and

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have available all data pertaining to the herd. Assuming that these arrangements have been made, the veterinarian must be prompt in keeping the appointment, and immediately upon arrival at the farm should discuss with the owner the contract under which the test is to be made. It is important that the owner should understand just what will be required of him, and know the benefits he may derive. A thorough understanding between the owner and the veterinarian should be had before proceeding with the test, as this may avert dissatisfaction later. The owner's future attitude toward tuberculosis control work, whether it is to be favorable or otherwise, may depend largely upon his impressions of the veterinarian's manner and methods. For this reason the veterinarian should be agreeable, careful in every detail, and considerate. Tact and consideration are usually successful in establishing respect and confidence in the man and his work.

The history of the herd should now be obtained—where the animals originated; whether previous tuberculin tests have been made of the herd or of any of the individuals; whether any animals have been sold or slaughtered or have died recently, and the cause. The number of animals in the herd should be obtained, and a physical inspection of the animals made to detect tuberculosis or any other diseases or conditions which might influence the accuracy of the test. Arrange with the owner at this time for all help that will be needed in handling the cattle during the test.

Errors are so likely to occur in handling large herds that the only safe way is to formulate a plan of work, and adhere strictly to it. The animals should be arranged in the stable in the manner most convenient. Give each animal a stable number corresponding with the stall number, record it as well as the herd number, registry number, name, date of birth or approximate age, sex, and brief description. These points of identification of each animal must be established and recorded before proceeding with any tuberculin test.

THE SUBCUTANEOUS TEST

Special Instructions

Before proceeding with the test the owner should be instructed as to the care and management of the herd during the test.

1. The amount of feed, including roughage, should be materially reduced in dairies which are fed heavily, and feeding should never be done directly before the time for a temperature measurement.

2. Watering.—Where individual drinking cups are not provided, it is best to water the animals immediately after the tuberculin is injected, and when it is possible they should be allowed small quantities of water often, but never immediately before taking a temperature.

3. Ventilation should be regulated to secure as far as possible a moderate temperature. A record of the barn temperature should be kept.

4. Milking should be done as usual.

5. Stables should be kept clean.

6. No animals should be moved without the permission of the veterinarian.

Technique of the Test

Before beginning the test the veterinarian should provide himself with clean over-garments and disinfected rubbers or boots.

In applying the subcutaneous test, at least three preliminary temperatures are taken two hours apart, and recorded with the date and hour on the temperature sheet. The thermometers used must have been standardized by the United States Bureau of Standards, and must be clean and disinfected. They should be lubricated with a nonirritating oil containing a small amount of nonirritating disinfectant, and be inserted well into the rectum, remaining in the animal at least two minutes. A five-inch thermometer seems to give the best satisfaction.

The injection of tuberculin should be made immediately after reading the last of the preliminary temperatures, provided they have been normal. No animal with a high or irregular temperature should be injected. The dose of tuberculin used should depend upon the age and weight of the animal, and whether any previous test has been made within a short time. The dose of U. S. B. A. I. tuberculin under usual conditions is from 2 to 6 c.c. In retests or with suspicious animals larger doses are recommended. The dose of tuberculin used and time of injection should be recorded on the sheet.

For the injection use either a 6 or 10 c.c. syringe with screw needles $\frac{1}{2}$ to $\frac{3}{4}$ inch in length, 16 gauge. The syringe and

needles should be sterilized before beginning the test, and the needle is disinfected after each injection. The point of injection is either the side of the neck, or the soft skin back of the elbow. The injection is made subcutaneously and not intramuscularly. The skin is raised with one hand, and the injection made quickly but carefully with the other. Disinfection of the skin at the point of injection is generally recommended, though it is a question whether it is effective; but the disinfection of the needle before each injection is of the utmost importance.

Post-injection temperature measurements should begin at the eighth hour after injection, and be continued at two-hour intervals until the eighteenth hour at least. But when the temperature of an animal is rising, the measurements must be continued until there is a definite reaction, or until the temperature begins to fall. The temperature of any animal showing a definite rise should be checked with another thermometer. When using large doses of tuberculin or in retesting, the temperature measurements should be taken as early as the fourth or sixth hour after injection. All temperature readings must be recorded immediately on the temperature sheet, with the date and hour of the measurement.

Interpretation of Results

For years a gradual rise of 2 degrees or more above the preliminary temperatures, followed by a return to the normal, was considered a reaction, but for accuracy we can not be guided entirely by this rule. We must consider the history of the herd, the age and condition of the animal, and the extent of disease in the herd. Care and judgment must be exercised in deciding the results of the test, as it is often difficult to interpret a reaction. A reaction is not simply a sudden rise in temperature for a short time, but is a gradual rise, with a high temperature for a period of at least two temperature measurements (it may be longer), then it recedes slowly, thus forming the typical curve of a reaction, which is the most important indicator for the interpretation of the test. The rise of temperature in reacting animals varies from 1 to 5 degrees or more above the normal temperature of the individual. A thermic reaction is often accompanied by a physical reaction, which may be manifested by a roughened coat, a chill, depression, diarrhea, or, in some cases, loss of appetite.

An animal during a test may give a rise in temperature from

causes other than tuberculin, which may be mistaken for a reaction. For this reason it is necessary to study carefully all elevations of temperature before finally deciding that an animal is a reactor. The results of the test should be recorded on the temperature sheets in the following manner: N, indicating negative; S, indicating suspicious; P, indicating a positive reactor.

Various Influences Which May Affect the Reliability of the Subcutaneous Test

1. Driving or moving the animals any distance in hot weather.
2. Direct rays of the hot sun on an animal.
3. Close and badly ventilated barns.
4. Exposure to cold drafts, and subsequent chilling.
5. Depriving the animals of water during the test, or, conversely, permitting them to drink large quantities of cold water.
6. Allowing bulls to be used for service during the test.
7. Cows on official milk record test, or excessive bagging of cows.
8. Repeated or recent tuberculin tests.
9. Changes in feeding and attendants may affect nervous cows.
10. Animals which have never been tied or confined, or those which have been on pasture for some time, when stabled for the test frequently show irregular temperatures.
11. Animals with acute indigestion.
12. Animals affected with metritis, mammitis, hemorrhagic septicemia, actinomycosis, or any condition which might carry a high temperature.
13. Some animals normally show an elevation of temperature at feeding or milking times.
14. Chronic bullers often show erratic temperatures.
15. Recent or repeated injections of tuberculin may produce tolerance.
16. Oestrus, springers and calving are normal functions and should not be accompanied with any elevation of temperature.

THE INTRADERMAL TEST

Many of the instructions and conditions necessary for the proper application of the subcutaneous test are not required in making the intradermal test, but the identity of each animal should be thoroughly established and recorded (as described under general instructions) before proceeding with the test.

Technique of the Test

It is necessary to restrain the animal only at the time of injection and when observations are to be made. The site of injection generally used is one of the subcaudal folds, which is cleansed with a 60 per cent solution of alcohol. *Cleanliness* is one of the most important factors in this test.

We prefer for this work a 1 c.c. glass syringe with a screw needle $\frac{1}{4}$ or $\frac{1}{2}$ inch in length and 25 gauge. The syringe and needles are sterilized before beginning the test, and the needle after each injection is disinfected with 60 per cent alcohol.

The dose of tuberculin is 2 to 5 drops. If this is properly injected, a nodule about the size of a small pea will appear at the point of injection.

In making the injection we stand directly behind the animal and grasp the left subcaudal fold between the thumb and first finger of the left hand. The needle attached to the syringe is slowly inserted the full length into the dermal tissue, taking care that it is between the layers of skin, and not through them. Do not have the point of the needle too close to the surface of the skin, as superficial injections into the epidermis will not give as definite results as true intradermal injections. The needle should be slowly withdrawn after the injection, thus preventing any loss of the tuberculin. The point of injection in a normal subcaudal fold is the most dependent part, but when this fold is loose and flabby the injection should be made where the fold joins the under surface of the tail, as in flabby folds the reactions are diffuse and not definite. In most animals a swelling will appear at the point of injection within an hour after the tuberculin is injected, but this is of no diagnostic value.

Observations should be made at the seventy-second and ninety-sixth hours after injection or later.

Interpretation of Results

Consideration must be given not only to the size, but to the character, shape, general appearance and location of the local swelling. A small, hard nodule, not larger than a small grain of shot, often appears at the point of injection, but is not to be considered as a positive reaction. So much depends upon the methods pursued and the judgment of the operator that in the hands of a careless or inexperienced operator the results of the

test may not be reliable. Some operators are too prone to snap judgments. All operators should receive practical instructions in applying and interpreting the intradermal test if accurate results are to be obtained. "Experience is the best teacher."

In recording the results, use the code adopted by the United States Live Stock Sanitary Association as follows:

1. Animals showing no reaction shall be recorded at each observation as N (negative).

2. Reactors shall be recorded as follows:

(a) For circumscribed swellings, pea size (diameter $3/16$ inch) shall be used as a basic standard and recorded as P-1. Larger swellings shall be recorded as P-2, P-3, P-4, P-5, etc., in accordance with the findings, being two, three, four or five times the size of a pea.

(b) For diffused swelling, "Thick 2-X" shall be used as the basic standard and signifies a diffuse swelling in which the injected caudal fold is twice as thick as the normal fold. Larger swellings shall be recorded as Thick 3-X, Thick 4-X, etc., in accordance with the findings.

Thermic reactions follow intradermal injections more often than is generally supposed. These reactions occur any time between the eighth and twentieth hours after injection.

The accuracy of the intradermal test may be affected by—1. A careless or improper injection. 2. Using a syringe and needle which have not been properly sterilized. 3. Using a tuberculin not specially prepared. 4. Injecting into an unclean subcaudal fold. 5. Using too much force on the syringe in making the injection. 6. Pricking the skin a number of times with the needle while attempting to inject. 7. Making the injection in a loose, flabby fold. 8. Using strong chemical disinfections on the fold before making the injection. 9. Pinching or bruising the fold. 10. Making careless readings of the results without due regard for the proper period of time after the injection. 11. Recent or repeated injections of tuberculin may produce tolerance.

THE OPHTHALMIC TEST

The ophthalmic test, while not recognized as an official test when used alone, is a most valuable adjunct to the other tests. It can be used at any time, or in any combination, without

interfering with the efficiency of the other tests or having its own results modified by their influence.

Technique of the Test

As in the other tests, the identity of each animal must be established and recorded. Examine the eyes for any abnormal conditions, and do not apply the test to animals which show any local inflammation of the eyes.

Ophthalmic tuberculin is prepared in both disc and liquid form. In applying the liquid, a curved glass dropper, with an outlet as small as possible, is preferable. The animal's head is held by an assistant in such a position that when the operator instills the tuberculin on the eyeball it will be diffused at once over the entire surface of the eye. Close the eyelids with the hand for a few seconds, to prevent escape of the tuberculin.

In instilling discs, clean hands with short, smooth nails are necessary. A disc should be placed between the thumb and first finger. The animal's head must be held by an assistant in such way that the operator can, with his thumb, place the disc well back on the eyeball, under the upper lid, and toward the outer canthus of the eye. The hand should then be placed over the eyelid for a few seconds, until the disc dissolves.

In making an ophthalmic test the eye must be sensitized with 2 or 3 drops of a 4 per cent solution of tuberculin, or one disc when that form of tuberculin is to be used. No records of the results of this sensitization are usually made, although sometimes a distinct reaction occurs. Three or four days after the eye has been sensitized, apply 2 or 3 drops of 8 per cent solution of tuberculin, or 2 discs. Observations should be made at the third or four hour after the instillation of the tuberculin, and continued every two hours, until the twelfth or fourteenth hour.

Interpretation of Results

The following code is used in recording the ophthalmic test:

1. Animals showing no reaction shall be recorded at each observation as N (negative).
2. Reactions shall be recorded as follows: Small amount of pus, P-1; much pus, or a distinct purulent discharge, P-2; abundant pus, combined with hyperemia of the conjunctiva and swelling of the lids, P-3.

In observing the results of the test, do not be confused by a

slight, white mucous discharge that often occurs soon after the tuberculin has been instilled.

Observations must be made at frequent intervals, as the animals often destroy the evidence of reaction by rubbing the eye.

In shipped cattle this test is often unreliable, because of exposure, contagious ophthalmia, or foreign bodies in the eye.

When tuberculous animals do not react to any of the tests, the disease is either arrested, or advanced, or in the incubative stage.

DISPOSAL OF REACTING ANIMALS

At the completion of any test the owner should be notified of the results, and all suspects and reactors must be quarantined and tagged for identification. In Pennsylvania we also use a form describing and diagramming the animal—a form similar to those used by registry associations. If the owner elects, the reactors are appraised by an agent of the Bureau, and the owner is requested to arrange for their slaughter. When these arrangements are complete, a permit is issued for the removal of the reactors to the slaughtering establishment where they are killed, and postmortems are made supervision. A report of the finding is submitted to the central office.

POSTMORTEM EXAMINATIONS

Extreme care must be used in making postmortems, as too often lesions are overlooked. In cases where the lesions do not appear to be characteristic of tuberculosis, specimens should be submitted to the laboratory for examination.

The importance of a searching postmortem examination was shown recently when examining a large number of reactors. In one of the animals the most definite lesion found was in a skin lymphatic gland between the ribs. In a second animal the only lesion was a caseous prescapular lymphatic gland, while in another animal one of the sublumbar lymphatic glands was caseous, although this was not the only lesion in the carcass. Laboratory examination confirmed all of these lesions.

CLEANING AND DISINFECTING

This phase of tuberculosis eradication is too often neglected.

It is the duty of the veterinarian to make a careful inspection of the barn and its surroundings, to advise the owner of any defects in sanitation, and to outline preventive measures.

Upon the completion of a tuberculin test, where reactors have been found, the veterinarian should instruct the owner in every detail of cleaning the premises, which should be done immediately following the removal of the tuberculous animals. The disinfecting should be done under the direction of the Bureau or Board.

In Pennsylvania disinfection is considered of such importance in the work of tuberculosis eradication that the State has trained agents who supervise the disinfecting, and also furnishes an officially approved disinfectant free of charge.

COMBINATION TESTS

The subcutaneous, intradermal and ophthalmic tests are not infallible when applied independently, but will give more accurate results when applied in combination.

Now that the tuberculin tests in combination have been approved as one of the final tests before a herd is accredited as free from tuberculosis, it is suggested that care and judgment be used in the selection of the order in which the tests are to be applied.

A combination of either two or three tests may be used. In a double combination the tests most frequently used are the subcutaneous and the ophthalmic, or the intradermal and the ophthalmic, but the intradermal and subcutaneous combination is also used.

In the triple combination, of course, all three tests are used, but the efficiency of each test depends upon the order of their application.

In describing the order of application of the tests in the triple combination I will refer to them as Combination A and Combination B.

Combination A is a combination of all three tests applied as follows: At the time of the injection of the intradermal tuberculin one of the eyes is sensitized with ophthalmic tuberculin. At the seventy-second hour after the injection of intradermal tuberculin the first observation of the results of the intradermal test is made, and at this time the first preliminary temperature for the subcutaneous test is taken, and the test is then made and recorded in the usual manner. The final instillation of ophthalmic tuberculin is made at the time of injecting the subcutaneous

tuberculin. The usual observations of this test are made, and at the completion of the subcutaneous test the results of the intradermal test are again observed. At this time the final results of all three are recorded. This order of application is very favorable to the intradermal and ophthalmic tests, and excellent results are obtained.

The results of the subcutaneous test are unsatisfactory, because of the interference of the intradermal test. This can readily be accounted for, as in many tests there is a thermic reaction in animals from the injection of tuberculin intradermally, and it is only reasonable to believe that when animals give marked thermic reactions to the intradermal test, they will not react with any degree of certainty to a subcutaneous test applied in less than three days after they have reacted thermally to the intradermal test. For this reason when Combination A is used it is rare, if ever, that any animals react to the subcutaneous test only.

The results of the ophthalmic test in this or any other combination are not interfered with by any of the other tests.

Combination A in detecting reactors is apparently satisfactory, but the results are often confusing and difficult to explain to the owner.

In Combination B, intradermal and subcutaneous tuberculin are injected simultaneously and the sensitizing dose of ophthalmic tuberculin is instilled in the eye. The results of the subcutaneous injections are recorded at the completion of that test. Observations of the intradermal results are made at the seventy-second hour after the injection, at which time the final ophthalmic instillation is made. That test is carried on in the usual manner, and the results recorded. A second observation of the intradermal results is made at the ninety-sixth hour, and recorded, which completes the simultaneous test.

The best results are obtained in this combination from the subcutaneous test, which evidently interferes somewhat with the results of the intradermal, though not to the same extent that the intradermal injection influences the subcutaneous in Combination A.

The facts presented in this paper are deductions from field experience in herds where it was possible to conduct the work under conditions favorable to accuracy.

A COMPARATIVE STUDY OF HUMAN GRIPPE AND CONTAGIOUS PLEUROPNEUMONIA OF THE HORSE (EQUINE GRIPPE)

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I. INTRODUCTION

MYSTERY has reigned for decades concerning the nature of the affection called contagious pleuropneumonia of the horse, a mystery which is analogous to that concerning Spanish gripe.

It is recognized that Spanish gripe is not a new disease. It is identical with the pandemic influenza of 1889-91. As for contagious pleuropneumonia of the horse, the origin of the different names for the disease, such as influenza pectoralis, contagious pleuropneumonia, Brustseuche (German), etc., is not known. These different names specify a lesion of the thoracic organs. But the change in the pectoral organs is not related to the symptomology of contagious pleuropneumonia, no more than pneumonia is the consequence of the normal course of human influenza, or measles, scarlatina, whooping cough, articular rheumatism, diphtheria, or other diseases.

In the different human maladies just mentioned it is not unusual to see some pulmonary localizations as the usual causes of death. This is true in the so-called pleuropneumonia of the horse. The pulmonary and pleural changes are only secondary; thus it is unreasonable to designate them by the names of the complications which may occur, as is the custom.

People have always been interested in the secondary pulmonary lesions which are considered as specific. That is the reason, I believe, why, although some eminent bacteriologists have concerned themselves with the question, they have arrived at only insignificant results. Clinicians have always named, described and treated diseases according to the symptoms or com-

¹ From the *Revue Generale de Medecine Veterinaire*, vol. 30, p. 378 and p. 441, 1921.

plications which they manifest. Every microbiologist has looked for a microbe. In case of intestinal disorder, sometimes the thoracic organs and most often the lungs, sometimes the pleura, the heart or the pericardium were secondarily affected, either separately or at the same time; or, although some cutaneous or cerebral symptoms were manifested, different names were given and different pathogeneses were attributed to the affection, but its exact nature was misconceived. From this misconception originated the idea that a pulmonary inflammation belonged to the symptomatic picture of the disease. In case the pulmonary inflammation was lacking, the affection was quite simply considered as averted, or it was even likened to typhoid fever.

Dieckerhoff is principally the creator of this confusion, because he placed typhoid fever and pleuropneumonia of the horse in the same group. He classified the two diseases under the names of *influenza catarrhalis* and *influenza pectoralis*. He also recognized, as a special affection of the respiratory system, a diffuse infectious bronchitis with a subacute progress (*scalma*), an infectious and quite endemic laryngitis. All this was the cause of a confusion to which is due the polymorphous picture of the so-called contagious pleuropneumonia.

It is only in the latest edition of the "*Traité de Pathologie et Thérapeutique Spéciale des Animaux Domestiques*," by Frohner and Zwick, in 1919, that Zwick treated typhoid fever and the so-called contagious pleuropneumonia as two characteristic diseases, etiologically different.

I have been able to make an exact valuation of the nature of contagious pleuropneumonia of the horse, thanks to —

(1) The thorough study of typhoid fever (*influenza catarrhalis*) pursued for more than two years by means of a stallion (*Demi-Monde*) which was a carrier of the disease and which possessed the power to infect only at the time of service.

(2) The preventive treatment of horses which had recently arrived at the remount depot, with serum against benign glanders. Before the application of this serotherapy, infectious pneumonia appeared during the course of benign glanders, and vice versa. That was also an important factor contributing to the misconception of the real nature of infectious pneumonia. The mingling of the symptoms in these associated infections is very serious; the production of pulmonary complications is not

rare, as well as death. There frequently appeared, moreover, under the same circumstances, some infection of the blood which occasioned confusion.

(3) The curative treatment of horses attacked with infectious pneumonia, by means of serum which was very powerful against the diplo-pneumo-streptococcus, from which fewer complications resulted.

(4) The early apprehension of the sick by regularly, morning and night, taking the temperatures of all the animals present, as well as by immediately isolating the sick in a stable where they were in the most favorable conditions, in order to reduce to a minimum the danger of complications. Relying on the clinical observations of a very large number of cases, upon bacteriological research, experiments with infection, and analogous medical studies of the contagious affections of the respiratory organs of man, I proposed, in a preliminary communication¹ in 1916, to speak of influenza of the horse instead of contagious pleuropneumonia. I did this to avoid further confusion.

My conviction that this name is exactly appropriate results from the numerous communications relative to human grippé (influenza) which have appeared in Dutch and foreign periodicals. It is from these that I have acquired the certainty that human influenza and contagious pleuropneumonia of the horse are etiologically, symptomatically and epidemiologically absolutely identical.

The equine disease is especially prevalent among young horses of the army. This is notably the case when a large number of young horses are lodged in too small stables, leaving much to be desired from a hygienic point of view. This sudden assemblage of different horses is observed at the time of mobilization. In Holland the disease appeared as early as August 1, 1914, among the cavalry of many of the mounted troops of the field army, and it raged regularly in the depots and field hospitals.

After working in the laboratory for more than two years, with the study of this disease, I had the occasion to study it clinically by remaining at the remount depot.

¹ See references to literature at end of paper.

II. THE SYMPTOMATOLOGIC IDENTITY OF CONTAGIOUS PLEURO-PNEUMONIA OF THE HORSE WITH HUMAN INFLUENZA

Thanks to regularly taking the temperature of all the animals present, permitting an immediate disclosure of the animals affected, I was convinced of the real nature of the disease (infectious pneumonia). From the results obtained, it appears that the method which I followed is absolutely indispensable in the fight against this disease. Even the most minute control, which permits only the slightest alteration in the general condition, may be considered as insufficient. By taking the temperatures several times it was found that an affected animal continued to eat and presented no cerebral depression nor any symptoms at all. When such a subject is not taken from his work and his company, something which does not occur in civilian life, the probabilities are great that a complication of the thoracic organs will be produced before the aid of a scientist is secured. The regular taking of the temperature gave at the same time an idea of the period of incubation.

Symptoms Manifested During the Normal Course of Contagious Pleuropneumonia of the Horse

One of the first characteristics, generally the first, is fever. At two jumps, most frequently in 48 hours, the temperature rises to above 40° C. The period of incubation is then very short; cases are observed where in a few hours the temperature has risen to 40° C. and above, although in the morning it was normal. The progress of the disease is then acute, sometimes very acute. No prodromal stage is observed. The absence of this makes the quick rise in temperature characteristic. The fever progresses along with muscular tremors, shivering, and coldness of the ears and extremities. Generally the temperature remains high for three days (with very slight fluctuations); it may even be very high, 42° C. or more. The thermometric fall is just as rapid as the elevation. It likewise takes place in two drops, so that the temperature will have returned to normal at the end of two or three days. This fall coincides with the amelioration of the general condition. The appetite is recovered, the thirst is diminished; in short, the general infection is overcome. Except in case of a complication, the majority of the sick animals will have recovered in five or six days. The curve of the fever incontestably is of prognostic

value. If important fluctuations are noticed in the rise or fall of the temperature, it is because complications have set in. Temperatures very high at the beginning of the disease are nothing alarming.

The digestive apparatus does not remain entirely normal. Stomatitis is always observed to a slight degree. The tongue is warm, usually tumefied and covered with a ropy saliva. The appetite is affected, the animal takes little or no oats. During the first days certain of the horses continue to eat but do so slowly. Generally it is oats which are first refused, usually on the third or fourth day. At the onset the animals accept more crushed oats and some bran; on the whole they prefer grass. It is also rare to prove that a horse affected with infectious pneumonia continues to eat at all to relieve the anorexia. Drink is taken with avidity. At the beginning of the disease the dung is hard and covered with a gray, yellowish fibrinous coating. After the expulsion of the feces which were in the digestive tract before the subjects were taken sick, the fecal material is of the same nature as in cases of affection with high fever.

From the beginning of the disease the respiration is superficial, irregular and accelerated, the rate varying from 20 to 40; it may reach 50 or more. In the majority of cases there exists a dyspnea of various degrees; the respiratory movements are affected with nostrils wide open. The intercostal pressure sometimes shows some intrathoracic disturbance. Percussion does not permit the recognition of pulmonary lesions, nor auscultation, except a roughness of the respiratory murmur in the main bronchi.

The nasal mucosa is moist, hyperemic and glistening. By the nasal openings are expelled, in small quantities, drops whose color varies from yellow to reddish brown and which dry up in little crusts. In only one case was I able to observe bloody drops. The nasal secretion is generally slight.

The cough is invariable and it is short, superficial, weak, dry, and is heard only intermittently. Its cause is not a laryngitis; this irritative cough is of a reflex nature.

The conjunctiva presents a special aspect, that of a leaden color and glistening; sometimes it has a yellowish hue.

The pulse is variable; at the beginning of the affection it is usually low and slightly accelerated, sometimes irregular, and

on an average 50 per minute. The rate is not always in accordance with the fever.

In addition to the fever, the general appearance, the manner of standing, the weakness and the gait are characteristic. During the febrile period the animals have the appearance of being severely affected. The manner of standing is unsteady; they remain immovable; they hate to change their position; usually they do not lie down. The eyes are completely or partially closed. When walking the weakness of the back is characteristic; the displacements are incoordinate and unsteady, which is considered a pathognomonic symptom. The animal walks as if intoxicated, even after the temperature has returned to normal for several days. This is remarkable after an affection of so short a duration.

During the febrile period some albuminuria is noticed, which disappears at the time of the fall in temperature. The urine contains no sugar but many urates. The micturitions are normal at the beginning of the disease; later there is polyuria.

The vaginal mucosa is hyperemic and secretes a ropy fluid. Local perspiration is frequent.

The course of the disease is remarkable. As has been said, the fever, after having reached its maximum in two bounds, remains stationary for two or three days; it then falls, and the picture of the affection is generally entirely modified. The majority of the sick recover in an average of six days. This favorable termination is observed in a very large number of the sick if they have been isolated immediately in a stable where they find the most favorable hygienic conditions. The above-mentioned symptoms must be attributed, then, to genuine contagious pneumonia of the horse.

It cannot be disputed that the symptomatic picture is identical with that of human influenza with a normal progress. The following will demonstrate that this analogy also exists for the complications which follow.

Just as in human influenza, in the horse also there are numerous alterations in the normal pathologic process. One might thus be inclined upon clinical grounds to make a distinction between the catarrhal or respiratory, gastric or gastroenteric and nervous forms, according to the predominance of respiratory symptoms, gastroenteric symptoms, or even of the nervous alterations. I prefer the differentiation between forms

with a normal progress and those where important modifications are produced. Even when the affection rages in one stable, it sometimes happens that the different forms are found together. It is to that fact that the disease owes its polymorphous character.

1. The rudimentary form, always considered an abortive form of contagious pleuropneumonia, develops in two days. The fever is from 38.5 to 39.5° C.; the animals are slightly dejected; the appetite is a little affected and from time to time there is coughing. In spite of this favorable evolution this rudimentary form may have as its consequence the production of laryngeal hemiplegia and of tendinous synovitis, which proves that this form is determined by the same infectious agent. This is of great importance when determining the origin of the laryngeal hemiplegia.

2. Cases where the affection is benign and accompanied by marked disorders of the digestive tract and the cutaneous functions belong to a second group.

(a) Just as in human gripe, in the horse there may predominate at first some gastroenteric symptoms, such as loss of appetite and diarrhea. These are not rare. Colic is observed, moreover, with ejection of the dung. Several times I found the anus gaping on the third or fourth day. This rectal paralysis in all cases persisted only one or two days. It is then impossible to take the rectal temperature.

(b) As in human gripe, some cutaneous symptoms may be present. In addition to local sweating, I have ascertained some small cutaneous tumefactions where later desquamation and depilation are observed, due to the previous production of exanthema. In the case of two sick animals I noticed an extensive eczema on the head and legs. In literature there are reports of cases where the mane and hair of the tail fell out.

In this respect, also, there is an analogy with what is observed in human gripe, a sudoral hypersecretion and cutaneous lesions, which in some cases are assembled under the form of spots analogous to those of measles. In other cases these lesions form scarlatina-like plaques. The falling of the hair is also produced in the horse in mild cases as well as in severe; new hairs are already formed beneath those which have died. Even if the hair continues to live, the hair bulbs are manifest during the febrile period. They are observed especially on the hairs

of the tail where the spinal cord is interrupted for a space of about 5 mm. The hair is finer there and provided with a stricture. At the same time there is observed an affection of the horny production of the foot, clearly manifested later under the form of depressions (rings). These two changes are the consequences of nutritional disturbances. The falling of the hair, the change in its growth and the rings of the hoof are produced then in the same way as in human grippe.

In a third group of cases I place those which, although they terminate favorably, present a more severe symptomatic picture, and notably—

3. Cases where the entire symptomatic picture is pronounced. The animals give the impression of being severely affected. The head droops; it appears too heavy to be raised. The eyelids are closed. The sick refuse all nourishment, remain motionless and do not lie down. On the fourth day of the febrile period, an improvement is noticed simultaneously with the fall in temperature.

In certain cases symptoms of one organic group are more pronounced and last longer than normally. Then severe manifestations, cardiac or pulmonary, predominate, alone or associated. These manifestations are the consequences of disturbances of innervation, coming from the action of the microbial factor.

The cerebral affection asserts itself through motor, psychic and sensory disturbances. The position of the animals is uncertain; they do not dare to change their position, and they support themselves whenever they can. If they do not find this support, they take strange positions, knees drawn close under the body, the rump greatly huddled up. Usually they do not lie down at all; if they finally do lie down the act is quite brutal. Generally they get up quickly; they give the impression of being afraid of being unable to stand up. The change in the motor centers also plays a part in the weakness of the back and of the muscles, which I think is incorrectly named. It is not a question of motor weakness; the weakness is the result of incoordination. Because of imperfect innervation, there is a break in the harmonious functioning of the different muscular groups, from which result the disunited and uncertain movements. The animal stumbles, a condition shown much better when it is blinded.

The comatose condition is not so pronounced as one might think at first sight. If one approaches the subject, or if he wishes to push the animal over a little to make an injection, the aspect changes immediately; the coma is replaced by a convulsive state; the animal looks about anxiously. The quick closing of a door or window, or the entrance of a dog into the stable may provoke this excitement. During this period, I frequently noticed some hyperhidrosis. This overexcitation is generally followed by an extraordinary depression. The articulations are mournful; the weight of the body is usually carried on one leg or the other. The intercostal pressure indicates pleural sensibility, in spite of the fact that the lungs are absolutely normal.

As other symptoms of a special group of organs, cardiac changes may be noticed in benign cases. The heart beats are even and the pulsations jerky. These symptoms are always only temporary and their disappearance coincides with a great amelioration of the general condition.

I add to the same group of benign cases those with pronounced changes in the respiratory tracts. These may be limited to the anterior as well as to the deep tracts. Among the first are the mild catarrhs of the nose or of the nasal pharynx; among the second, notably the temporary congestive state of the lungs. These last varieties of the normal course of the affection, which gave me a general view of the disease, were determined by means of a diagram of the semi-daily recording of the pulse, temperature and respiration. Several times cases were determined where the lungs were affected. At the beginning of my clinical study I was embarrassed by such observations until after I had proved that sometimes twelve to twenty-four hours later nothing could be seen of the pulmonary affection present at the beginning, and that in place of an aggravation, there was an important amelioration of the general state. Autopsy of the animals in which such a pulmonary hyperemia was observed showed that the congested state might be limited and that in general no more germs were found there. It will result from what follows that this change must be due to the action of the toxins on the pulmonary vasomotors.

Changes in the intestinal tract.—Among the important changes in the intestinal tract must be observed the acute hemorrhagic inflammations, which may extend throughout the entire intestinal

tract or be limited to a part of the large intestine. In the first case the excretions are of a reddish color, dark or black, and severe colic is observed. The cecum may be secondarily involved.

Changes in the nervous system.—These exist in human gripe as well as in that of the horse. However polymorphous the symptomatic picture is, the nervous changes are found characteristically in the foreground. The picture of the disease is not complete if the nervous symptoms are lacking.

The different changes may be classified in two groups. In the first may be placed those cases in which mucous lesions of the respiratory tract are found in addition to the nervous symptoms. In the second group are the majority of cases, where the nervous symptoms exist exclusively without any sign of a primary local disease.

The nervous lesions are of a cerebral nature as well as peripheral, and their intensity varies with the degree of irritation provoked by the microbial factor, which may be moderate or severe. These changes are observed prevalently and more intensely in subjects of Irish blood, who have more sensitive nervous systems than those of the native, more lymphatic race.

These nervous lesions may be limited (a) to the cerebrum and meninges; (b) to the medulla oblongata; (c) to the spinal cord; (d) to the peripheral nerves.

(a) *Cerebrum and meninges.*—When the irritation is moderate, the nervous symptoms are restricted to certain depressive changes and to disturbances in coordination. If it is more severe the nervous changes are also more severe.

(b) *Medulla oblongata.*—The nervous symptoms indicating a change in the centers of the medulla oblongata deserve special attention. It is very interesting to see a horse which appears to be quietly eating hay, but without ever swallowing. The partly chewed feed remains between the teeth and the cheek or falls from the mouth. On more careful observation it is found that the lips are weakened, especially the lower lip, which droops (facial diplegia). In order to drink the mouth must be plunged into the water to above the labial commissures.

The taking of liquids and solids is then difficult. When the eating of solids is impossible, the tongue hangs out of the mouth (hypoglossal nerve involvement). When these sick animals take green feed, regurgitation through the nose occurs. The dis-

turbances in alimentation, mastication and swallowing are the consequences of a partial paralysis of the muscles innervated by the facial, hypoglossal and glossopharyngeal nerves. The lesion of the facial nerve is central; the zygomatico-temporal nerve is affected; the ears and the upper eyelids droop. The nostrils are contracted, yet they allow enough air to pass.

The vagus nerve as well as the second branch (the recurrent nerve) are affected. As a consequence of their irritation, there is produced a laryngeal stricture (laryngeal diplegia), which may also be the cause of an inspiratory dyspnea and disturbances of phonation. If the animal is descended from parents of which the stallion or mare presented a laryngeal hemiplegia, and if there exists therefore a hereditary predisposition for this disease, the disease remains chronic even if the form of the grippé was very rudimentary.

(c) *The spinal cord; medullary meninges.* (d) *Peripheral nerves.*—Rectal paralysis has also been observed in the course of contagious pleuropneumonia and always in the mare, very often associated with a caudal paralysis, sometimes with a paralysis of the bladder and of the hind quarters. The lower and posterior hemorrhoidal nerves give off motor ramifications to the tail and rectum, coming from the fourth or fifth vertebral pairs, as has already been mentioned. I was able to find cases of anal paralysis when the malady exhibited a normal course, and this was usually found after the crisis (fall of temperature). This paralysis did not extend to the rectum; the defecations were still performed, but slowly.

This causes me to admit that paralysis of the sphincter is of central origin. It is the same for the weakness of the back (posterior muscular paresis). At different times I perceived a habitual patellar dislocation (unilateral and bilateral) analogous to the vertical dislocation of the patella of man. The crural nerve innervates the quadriceps femoris muscle. Energetic contractions of this muscle may determine the patellar dislocation; it is unanimously admitted that this dislocation is the result of a severe weakening. It is true that this is presented by the animals which are evidently severely affected by the grippé, but one must not exclude its central origin. At autopsy, infiltrations and hemorrhages are observed in the meninges of the spinal cord. All these symptoms disappear except the laryngeal hemiplegia, which persists to the chronic stage with certain predisposed animals.

I was also inclined to attribute to the affection a permanent change in the movement of one or both hind legs, called "cock's gait," which appears in the Irish animals especially. This "cock's gait," according to my opinion, is the consequence of a change in the normal innervation. The movement is reflex. This chronic motor change is comparable to the minor chorea of man, which is also exhibited in the course of grippe. I believe that this disease should be considered as a change in co-ordination, as ataxia.

From the description of the neural disturbances which may be observed in acute cases of equine grippe, they may be classified under three forms—medullary, spinal, and peripheral. They are principally the consequence of the action of toxins of the microbial agent on the motor nerves.

Disturbances of the circulatory organs. (a) *Heart.*—The manifestations which the circulatory organs exhibit in their function are also the result of disturbances of innervation. They may greatly predominate, or even exist alone, without any change in the respiratory organs. In each case of the disease symptoms are found indicating that the vagus and sympathetic nerves are involved in the pathologic process. The intensity of the symptoms is in direct proportion to the irritation. If it is mild, the cardiac beats are accelerated; a more intense irritation provokes their abatement. A severe infection with a high, persisting fever exhibits as a result an intense degeneration of the cardiac muscle. The cardiac symptoms are then pronounced; the pulse is very frequent and weak; heart beats are bounding; cyanosis of the nasal, lingual and buccal mucous membranes is observed and life is directly menaced (angina of the chest and collapse). When cardiac lesions exist, the pathological symptoms are more rapid and more pronounced and the termination of the disease is frequently fatal. In these cases I made the following observations: In a subject in which the progress of the disease was natural up to the fourth day of the infection, the pulse and the heart beats did not give any occasion for therapeutic intervention. The sick animal had a good appearance and took the feed that I offered him. The horse gave the impression that the thermic reaction would be produced quickly. A half hour later I was informed that the animal had been found dead in the stable. I thought this sudden death could be attributed to cardiac paralysis. At autopsy I

found a cardiac hypertrophy and myocarditis; the lungs appeared entirely normal. As a complication of grippe of the horse, found also in man, an endocarditis and pericarditis may be produced.

(b) *Vascular system*.—Among the most interesting neural symptoms are manifestations on the part of the vascular system. Their production is also the consequence of the disturbance of innervation caused by the direct action of microbial toxic products on the vasomotor center, as well as on the center of the vascular nerves in the medulla oblongata. The results are various and are found here also in relation to the nature of the irritation. The numerous indications prove that an irritation of the vasomotor nerves is produced. If this is prolonged or becomes more intense, vasomotor paralysis results. In consequence of the irritation of the vasomotor center, all the arteries contract at the beginning of the affection, from which there results an increase of blood pressure and the dilatation of the heart as well as of the veins. At the time of the paralysis of the nervous center, we see the opposite condition produced. It is this which explains the variations in the rise of the pulse and the heart beats, becoming established in the course of the affection.

If, after an intense irritation, a consecutive paralysis of the vasomotors is produced, the pulse becomes weak and slackened and the heart beats slight and slow. The vasomotor paralysis may also be local, limited to a special nerve innervating a radius or fixed organs, as, for example, the intestine, the lungs, kidneys, pleura, etc. An arterial congestion of this radius or of this organ follows immediately, from which results the production of the bloody injection (hyperemia) with the rise in temperature and an increase in the capillary transudation. These vessels become dilated and the circulation of the blood is impaired.

Thus is explained the accumulation of a transudate in the pericardium, thorax, joints, bursæ, synovial sheaths, etc. (transudative pericarditis, pleurisy, arthritis, etc.).

What is especially characteristic in this disease is the tendency to hemorrhage (cerebral, ocular, auricular, cutaneous, nasal, pulmonary, intrathoracic, gastric, intestinal, renal vesical and uterine hemorrhages). They too are the consequences of angioneurotic disturbances. There may also occur in the course of the affection epistaxis, hemorrhagic pleurisy, enteritis, neph-

ritis (hematuria, hemoglobinuria), abortion. This process is derived especially from the venous center. I explain the foundering of the horse in this way.

In the skin may be produced in the course of influenza (in man more perceptible than in the horse) different forms of paralytic phenomena of the vasomotor nerves, exanthema, which are manifested in certain cases in isolated plaques (like measles); in others in confluent plaques (like scarlatina). If the transudation is increased in the cutaneous vessels, vesicles are formed; moreover, an extravasation of red blood cells may occur, and thus edema, hemorrhage and even eczema may arise.

As a consequence of the sanguineous transudation of polyuria and hyperhidrosis, there may be noticed a diminution in the weight of the body, a condition which may be important in a short time.

Like vasomotor disturbances, it is necessary to attribute trophic disturbances also, such as the abnormal horny growth (hoofs), the desquamation and falling out of the hair (of the mane as well as of the tail), to the change in the sympathetic nerve due to the toxins of grippe. The abatement and the obstruction of the circulation of the blood cause the dilatation of the cutaneous capillaries; the blood there becomes largely venous, from which results the bluish discoloration of the skin.

Changes of the respiratory tract.—If the respiratory organs are involved it is the direct result of the action of the microbial agent upon the respiratory center and the nerves innervating the heart and lungs. The action is identical in the gastro-enteric form. All symptoms produced in the course of the affection are of primary neuropathic origin.

We have observed some severe cases without lesions of the anterior and deep respiratory tracts. In man, as well as in the horse, it has been possible to prove at different times that the existing pulmonary changes were not the cause of death.

Clinically, the coughing and respiratory acceleration give the impression that the respiratory tracts are involved. The respiratory changes may even be striking and cause one to think that the animal is suffering with a severe pneumonia. From the negative result of the thoracic examination it is evident that the changes in the respiratory organs must be due to disturbances of innervation. They are the consequence of the toxic action of the microbial factor, as much on the respiratory center, which

is found in the medulla between the pneumogastric nucleus and the accessory, as on the sympathetic nerve and the pneumogastric nerve which innervate the respiratory tracts.

The irritation results in frequent respiration; an intense, persisting irritation provokes a diminution of the number of respirations and even finally the arrest of the respiratory apparatus.

The pneumogastric nerve is very complex, which explains the polymorphism of the change in different parts of the respiratory tract. Inflammations of the nose, larynx, pharynx, trachea, bronchus, bronchiole and the pulmonary tissue may exist, alone or associated.

However favorable the evolution of the affection may be, it will always be found that the pneumogastric nerve is irritated by the microbial agent. Concerning this subject I refer to pathologic cases where a laryngeal hemiplegia persisted in spite of the disguised progress of the affection. Notwithstanding the fact that no sign of an inflammation of the mucosa of the larynx existed, such an inflammation was manifested by the cough. So this is also reflex, in consequence of the irritation of the center of coughing and of the sensitive ramifications innervating the larynx. In the horse there may still be manifested some edema of the glottis (dyspnea and rales). This condition may present itself in a few moments.

In many cases it may be asserted as if proved that the evolution of human influenza and contagious pneumonia of the horse takes place without any catarrhal change in the respiratory mucous membranes. In other cases there are found symptoms establishing the fact that this mucous membrane is involved; then the catarrhal symptoms are predominant. Their intensity is variable, according to whether the inflammation is superficial or deep, whether it is confined locally to the anterior tracts or extends as far as the deep tracts.

When the trachea or bronchi are affected there is great liability that the bronchioles and the lung tissue will also be involved. It may also come about that, although there is no marked affection of the respiratory mucosa, sudden pulmonary complications are produced.

We know that an intense irritation provokes vasomotor paralysis. If this is produced in the vasomotors of the pulmonary vessels, there results an immediate arterial congestion in the

regions innervated by the nerve ramifications (pulmonary congestion). From this vascular dilatation is derived a more profuse capillary transudation and the rise of serous products. Pulmonary edema will then be displayed at this place. The disturbances of respiration are then marked and the animal gives the appearance of being attacked with a severe pneumonia.

If there are complications in other organs death may occur. At autopsy one is then astonished to find a pulmonary lesion of small dimensions (often only the size of a tennis ball) in which the presence of germs can not be detected. This has also been proved by Koch and Gaffky in the horse. If the temperature does not fall after it has remained high for three days, if the fever remains constant with an association of respiratory disturbances, one may be assured that the pulmonary congestion exists as a complication.

It is to this period of the disease that one's entire attention must be given; if not, then the congestive state of the lungs may be the determining cause of death.

I consider the fourth day after the fever has reached its maximum as one of the most critical periods in the course of the disease of the horse. Two eventualities are then possible:

1. The congestive pulmonary state is maintained more or less for two days, after which there occurs a sudden fall in the temperature. Just as in the beginning of the disease the temperature reached its maximum in two bounds and in two days at the most, now we see it fall in two drops. At the same time and just as rapidly an amelioration of the disease occurs. The pulmonary congestion has been of short duration; the organ has overcome the microbial agent. The reaction does not progress with an increase of expectoration.

2. When the overexcitement persists, especially that of the nerves innervating the respiratory tract, the angio-neurotic symptoms of the lungs are pronounced. The lungs become congested because of the respiratory disturbances and from this there results a more profuse capillary transudation and finally the penetration of blood into the lung tissue. In this respect the striking conformity with what occurs in man can not be denied.

Now, according to my opinion there are two ways of explaining the presence of bacteria in the focus of the pulmonary inflammation:

1. Motor and sensory laryngeal disturbances (paralysis of the recurrent nerve with all its consequences) are caused by a hyperirritation of the motor and sensory nerves of the larynx. This paralysis gives occasion for the bacteria to penetrate into the lung.

2. The pulmonary focus of inflammation (hyperemia) is to be considered as a classical example of *locus minoris resistentiæ*, where there will accumulate the diplo-pneumococci which have penetrated into the circulatory system in the meantime.

According to my opinion the pulmonary infection is caused sporadically, bronchogenically but most frequently hematogenically.

In this way can be explained the production of other purulent inflammations which present themselves as complications of contagious pleuropneumonia and of human grippe. Among other observations I have found an empyema, which in one case extended to a fatal termination while the lungs were absolutely normal.

Having reached the focus of congestion, the bacteria multiply and provoke further inflammations, such as sanguineous necroses and abscesses. The presence of diplo-streptococci in the spleen proves that they penetrate into the circulatory system.

In respect to pulmonary complications in the horse, Prof. Gaffky proves the following microscopically:

The point of departure of the local modifications is determined by divisions of the finest respiratory ducts in which, at the beginning of the disease, there is produced a vitreous exudate, translucent, slightly gelatinous and yellowish, and in the periphery of which there is a large cellular accumulation and some serous infiltration. In the radius of the affected bronchial branch the pulmonary vesicles are filled with a richly cellular fluid. At places where the pathologic foci approach the pleura there also occurs an infiltration of the subpleural tissue with a translucent, yellowish, gelatinous fluid. The cellular tissue between the pulmonary lobules affected at the beginning of the disease is infiltrated with serum.

The occurrence of pneumonia in the course of the disease also depends directly upon the virulence and the action of the microbial agent on the nerves and the respiratory tract.

As far as the character, progress and mortality of grippal pneumonia of the horse are concerned, they accord remarkably with the pulmonary complications of human grippe. The same analogy is observed for the anatomopathological pulmonary and pleural lesions.

This analogy is not limited to a secondary pneumonia only; it extends even to the complications arising at the same time as the pulmonary lesions which may occur in the horse.

The primitive, erroneous name for the affection, "contagious pleuropneumonia of the horse," indicates that the pleura is simultaneously affected.

A dry, transudative, serofibrinous, exudative, hemorrhagic, purulent (empyema) pleurisy may exist, associated with the pneumonia or separately. The pleural vessels are then greatly injected.

The existence of a necrosed pulmonary focus in the pleural cavity is followed by empyema. There may also be produced a connection with a bronchus (pneumothorax). Pulmonary abscesses, pulmonary gangrene, pyemia and septicemia may also be observed.

The following diseases may persist in the horse as secondary affections of the pulmonary change: Heaves, as a consequence of the pulmonary emphysema; atelectasis of the lung tissue, cavities or the union of the pleura.

As further complications there may be found in the horse pericarditis, parenchymatous myocarditis, ulcerous endocarditis, acute leptomeningitis, parenchymatous nephritis (hematuria and hemoglobinemia), anasarca, arthritis, phlebitis (thrombosis), tendinous synovitis, icterus, exudative and hemorrhagic iritis, founder, abortion, etc.

When the affection of the horse proceeds normally and without complications, abortion is observed seldom or not at all. In severe cases, on the contrary, especially when the lungs are involved, the danger of abortion is great. Thus in this respect also there is an analogy to human influenza. It is not even necessary for hemorrhages of the fetal investing membrane to occur in order to produce abortion. The vascular disturbances from which stasis (accumulation of carbonic acid) or transudations result may cause the detachment of the embryo, without it being a question of inflammation. If hemorrhages of the chorion are observed, they are not necessarily of inflammatory origin. Blood is not extravasated by rupture or inflammation; it passes through the vessel walls which have become permeable.

Now, comparing the symptoms observed at the time of the influenza of 1918-1920 and described and published in the periodicals of this and foreign countries, as well as the symptoms

observed during the epidemic of 1889-1891 in Holland and Germany as well as France, I have established by clinical observations what I am about to describe:

1. That symptomatically the so-called "contagious pleuropneumonia of the horse," whether normal, rudimentary or complicated, is absolutely identical with human influenza;

2. That the expressions "contagious pneumonia," "contagious pleuropneumonia," "Brustseuche," etc., are absolutely incorrect and should be replaced by that of "equine grippé."

I admit that it was difficult for the practicing veterinarians to obtain an exact idea of the disease under ordinary conditions and without taking any special measures. This is due to the numerous accessory conditions which enter into consideration.

In the beginning I, too, had the temperature recorded only after a horse became less animated, when it coughed from time to time, or when it showed a loss of appetite, and I treated the patient in the stable in which it was taken ill. Soon I found that even the most minute inspection, permitting a detection of the least psychical disturbance of the horse, was insufficient to detect the affection at its beginning. As the very early discovery of an infected horse is of capital importance for the evolution of the disease, it is then indispensable—

1. That the temperatures of all the animals be recorded regularly, morning and night.

2. That the detention and treatment of the sick be carried on in a stable which is fresh, spacious, free from dust, quiet, and with good ventilation. As far as possible, fresh air should be introduced in a permanent way, without occasioning drafts of air. A necessary condition is that each patient have plenty of room so that he will not be bothered by his neighbors.

It is in such a stable that I was able to observe successively more than 500 subjects affected with contagious pleuropneumonia. As far as possible all accessory influences were removed here, and I was able to obtain a view of the polymorphous picture of the disease. The great importance which should be attached to the quick discovery of the patients, to their isolation, to amelioration of attention and to regular control certainly needs no further emphasis.

If identical measures are taken in individual stables in which there are a large number of horses, the clinical picture of the disease will also be presented there as in usual cases, and other

competent persons will be able to establish the exactness of the description which I have made of this disease.

Veterinary Captains Lameris and Van Syverden, who have been connected with the remount depot for several years and may consequently be considered as competent, declare that they are in accord with me in what concerns the clinical picture of contagious pleuropneumonia. Recently attention has been directed abroad to the identity of human grippe and this disease of the horse.

Orticoni, Barbier and Auge (2)¹ arrived at the conviction that a close relationship exists between the causal factor of severe forms of epidemic influenza and the animal "pasteurelloses," among which contagious pleuropneumonia is abusively classified in France.

In America attention has been directed by G. A. Soper (3) to influenza of the horse, the complex symptomatology of which, in his opinion, presents a great analogy to human influenza.

In Germany Hirschbruch (4) calls attention to the identity of grippal pneumonia with "Brustseuche." Although this is exact, nevertheless it is observed that the author makes the mistake of including the secondary pneumonia in the symptomatic complex, in human grippe as well as in the disease of the horse.

In Switzerland H. Swicky (5) indicated the analogy of an infectious disease of the respiratory organs of the mule with human influenza.

Lieutenant Colonel Knipscheer, who has served several years at the remount depot at Milligan and who has published several communications on the so-called contagious pleuropneumonia, indorses my opinion that symptomatically the identity of that disease with human influenza is incontestable.

Considered in the light of this clinical identity, bacterial and experimental investigations, instituted on a high scale for several years, relative to the transmission of the equine disease, receive a special importance from the point of view of human influenza. This is all the more noteworthy since the most eminent bacteriologists, such as Gaffky and Robert Koch, have concerned themselves with this question.

¹ Numerals in parentheses following authors' names refer to list of literature at end of paper.

THE NECESSITY OF LIVESTOCK SANITARY REGULATIONS IN THE CONTROL AND ERADICATION OF BOVINE TUBERCULOSIS ¹

By M. JACOB, Knoxville, Tennessee

IT SHOULD BE APPARENT to all that a constructive regulatory service can be regarded as such only when based upon corresponding laws, rules and regulations. The term constructive is used because it has far-reaching significance in our efforts to administer an efficient public service toward the results which we ultimately hope to attain. If your experience is similar to mine, you have frequently been forced to ask yourself the question whether or not the regulations under which you are operating permit the handling of your problems in a manner giving justice to all concerned. While our function is primarily that of controlling and eradicating transmissible livestock diseases, we must nevertheless give due consideration to the various agencies which become affected either directly or indirectly through the activities of our department; and while we can not hope to overcome all the ruffles in every instance, much greater progress will be made if we have assured ourselves that we are operating on sound basic principles. Such methods encourage more general public cooperation, without which our task becomes exceedingly difficult.

A comparative review of livestock sanitary control work as conducted in the various countries throughout the world easily places the United States in the front rank, and this can be attributed to the very fact that the guiding spirits of our system have been men of forethought and vision, coupled with the ability of practical application. I refer here especially to our Federal Bureau of Animal Industry. Accomplishments along this line by many of our State departments also entitle them to similar recognition.

Regarding the State and Federal departments, it may be stated that there is marked evidence of a relationship which is becoming closer from time to time; and as so much of livestock sanitary control work is cooperative, and each department work-

¹ Presented at the Tuberculosis Conference of the Southeastern States, Atlanta, Ga., 1921.

ing for a similar purpose, this is as it should be. This has resulted in a unification, to a considerable extent at least, of many of our regulations. I know of no good reason why it should not be the aim of every State to correlate her regulations so as to conform as nearly as possible to those of the Federal department, and if the laws of the State do not permit this, they should be amended at the earliest possible moment.

We have had no better example of advantage in uniformity of regulations than in what has been accomplished in the added efficiency in the inspection of cattle for interstate shipment. I fully realize that this is not by any means 100 per cent perfect at the present time, yet we can not deny the fact that the adoption of Regulation 7 has brought about a service more dependable not only to livestock interests, but to the veterinary profession as well. What has been accomplished toward greater efficiency in the interstate movement of cattle from a health standpoint can also be done with horses, sheep and swine, and I believe the time has come when we are ready for such similar extension of Federal supervision and cooperation, not overlooking the fact, of course, that local conditions must always be taken into consideration. It may seem that I am getting away from my subject, but this is only for the purpose of adding stress to the importance of more uniformity in our livestock sanitary relations.

Coming now to the subject proper, that of bovine tuberculosis, I believe it to be one of the most important questions confronting the livestock interests of the South at this particular time. I make this statement not to leave an impression of the extreme prevalence of this disease, but exactly the opposite, as indicated by the comparative reports issued at regular intervals by the Bureau of Animal Industry. But the very fact that the percentage of reactors is so small in our Southeastern States makes it impossible ever again to handle the problem as economically as at the present time. I firmly believe that the States which now comprise the Southeast, through the extension of our cooperative eradication work, supplemented with rigid enforcement of judicious regulations, can be made free from tuberculosis in a relatively short period of time. When I refer to an area as being free, I have in mind not over 0.5 of 1 per cent reactors, with a correspondingly low percentage of open lesions. The

history of the prevalence and spread of tuberculosis in the South reveals some interesting facts, and while my observations have been limited largely to my own State, I dare say conditions are very similar in the others. But the thing which has impressed me is that an earlier existence of certain control regulations which are now in force should and would have prevented many of the centers of infection which we have found within the past few years.

In 1909 I drafted a bill and, with the aid of the State Dairy-men's Association, had it passed through the legislature, requiring the tuberculin testing of all cattle brought into the State to be used for dairy or breeding purposes. The thing which impressed the importance of such a law was the discovery of a large shipment of purebred cattle into Tennessee, the physical appearance of which urged me to suggest the tuberculin test, and to the amazement of both the owner and myself, 90 out of 100 head reacted. When this case was cited to the members of our legislature it was not a difficult matter to produce a convicting impression as to the importance of such a livestock sanitary regulation. But, unfortunately, many importations had been made previous to that time with their varying degrees of infection. While a certificate of health recording a properly applied tuberculin test covering the shipment has given us a vast amount of protection against the introduction of tuberculous cattle, we are not by any means justified in relying on it as our sole dependence—a statement based on field observations. Consequently in March, 1918, we promulgated Official Order No. 42, requiring the tuberculin retesting of cattle shipped for dairy and breeding purposes within 90 days following their arrival in the State. Subsequent events have substantiated the wisdom of the adoption of such a regulation. It is one which should be uniformly adopted and enforced by our Southeastern States.

Furthermore, I am about convinced that all such retests should be applied by the combination method. In this connection I am compelled to make some additional reference to Regulation 7, which, as previously stated, has strengthened the efficiency of inspection for interstate shipment very materially. Yet the provision whereby it was possible to ship female cattle and bulls from public stockyards under the *nom de plume* of feeders and

grazers was found not to be wholly satisfactory, as it opened a dangerous gap; consequently the State assumed its prerogative by requiring the tuberculin test on bulls and females included in such shipments. The compliance with our ruling in this matter has already revealed several reactors at point of origin, which, under the original acceptance of Regulation 7, would have reached our State. Of course it might be argued that these cattle would have been held under official quarantine during the feeding or grazing period, but there is where the difficulty lies. Strict quarantine without immediate supervision is practically impossible with this character of shipments.

Under Regulation 7 it is also possible to ship cattle interstate to public stockyards where Federal inspection is maintained without restriction, and in order to minimize the possibility of distributing the infection from such shipments we issued our Official Order No. 57, which requires that before any cattle intended for dairy and breeding purposes can be moved intrastate out of public stockyards they must pass an official tuberculin test, provided such shipments of cattle have originated in other States. This again is in line with my original thought in that we must use every reasonable means toward preventing the introduction of tuberculosis from other States and probably more highly infected centers.

We can not lay too much stress upon the importance of vigilant supervision covering movements of cattle from those States which I reluctantly refer to as hotbeds of tuberculosis, for whenever we successfully control our importations we will have solved the greatest menace to the cattle industry of the South so far as control work on this disease is concerned. In other words, we should cease to be the victims of States like Illinois, Iowa, New York, and probably a great many others, where tuberculosis has become such a serious problem.

Several of our regulations toward the control of this disease have been adopted since the inauguration of State and Federal cooperative work and have been the means of giving material strength to the system as a whole. One especially which I feel is far-reaching in its effect is our requirement that all cattle 6 months old and over exhibited or maintained on the grounds of our larger fairs must show freedom from tuberculosis by the application of a recognized tuberculin test applied since Janu-

ary 1 of the year during which the fair is held. This regulation, I am pleased to state, has the utmost respect of our breeders of purebred cattle. The first year this regulation was put into effect one herd of cattle from another State reached our State Fair without a tuberculin test certificate. They were immediately tested by our department, with the result that two cows reacted, and they showed well-marked lesions on post-mortem. These same cattle had been exhibited at several preceding State fairs, including Kentucky, Ohio and Indiana. It should not require more than a single occurrence of this kind to impress the necessity of beginning with the enforcement of regulations governing the public exhibition of cattle.

This also brings to mind the restrictions which should surround public sales of purebred cattle. I am quite sure that the activities of certain purebred cattle sale promoters have been somewhat interfered with in our State by the enforcement of the 90-day retest regulation, which I believe has been a distinct benefit in two ways. First, it has kept out some undesirable cattle, and again has given greater protection against tuberculosis. However, my main point here is that all dairy and breeding cattle, whether of intrastate origin or otherwise, sold at public sales, should be sold on a recognized tuberculin test and subject to a 90-day retest, this in preference to a 60-day retest.

We have enjoyed the cooperation of our breeders and breeders' associations in this matter to a most satisfactory extent, with the result that practically all public sales of this kind within the past two or three years have been made up of cattle from herds under supervision. The East Tennessee Jersey Cattle Breeders' Association has included in its constitution a provision that in order to be eligible to membership the applicant must be maintaining his herd under State and Federal supervision. Regulations governing public sales should very soon encourage many breeders and breed associations to adopt a similar policy. When once a breeder or an association gets into this work, they are not slow to realize the advantage to be derived therefrom.

Many of our regulations now in force and the suggestions offered are centered to a considerable extent around purebred cattle, which is in accord with the existence of actual conditions. I have always contended that whenever tuberculosis has been

completely eradicated from our purebred herds Tennessee will be practically free from this disease. Importations for herd foundation or improvement is of course responsible for its greater prevalence among such herds.

So far I have dwelt on this subject principally in a manner involving interstate movement, but there are intrastate problems which must also be safeguarded and handled under proper regulations. Willing cooperation, as already stated, especially on the part of the owner, should be encouraged, if we hope to make maximum progress in eradication. While fair indemnity for reacting cattle is not the all-important point, nevertheless it gives an impetus, the results of which can not be obtained in any other way. I think every State should make it possible to reimburse the owner to some extent. While this does not necessarily influence the attitude of some, it means a great deal to others, especially the small breeder or the average owner of a milk cow. Furthermore, the gradual increase of Federal appropriations for indemnification purposes should be shared by the various States, the regulations of which should be adjusted accordingly.

Regulations governing the inspection of dairy and meat supplies, whether Federal, State or municipal, has also become a great factor toward what we may be able to accomplish in this work and should be encouraged in every way possible. The tuberculin testing of dairy herds in compliance with municipal regulations falls in most instances to the lot of the private practitioners. There are innumerable instances where some of our best practitioners have shunned such work on account of its interference with their regular routine of practice, consequently much of this work which otherwise would have been carried out or encouraged has been left undone. The more general recognition of the intradermic method of applying the test will, I believe, overcome this obstacle to a considerable extent, and with that in mind we have modified our regulations so as to recognize this test for dairy inspection work, which has already shown a decided increase in the number of dairy cattle tested, with post-mortems revealing just as much accuracy as by the subcutaneous method.

Postmortem reports from slaughtering establishments where inspection is maintained, covering lesions found, have also been

of great assistance in locating centers of infection. It would be well to require such reports to be made through special regulations. It is true that this is being done where Federal inspection is maintained, but it is not carried out as a rule where the supervision is municipal.

The disposal of reacting cattle is a question which is also entitled to most serious consideration in a discussion of this kind. Regulations regarding this matter should be specific and so worded that their meaning can not be misconstrued. Fortunately most States are now handling this phase of the work with greater efficiency, but there is no doubt that in years gone by many diseased cattle were lost sight of either with or without special design. Every State should know the ultimate disposal of every reactor within its borders. If the regulations in force do not make this possible they are lacking in the most vital point. The diseased animal is the spreader, and we can never hope to control and eradicate disease unless its movements can be restricted. Personally I am a firm believer in the slaughtering of reactors at the earliest possible moment, but there are conditions under which, in justice to all concerned, we provide for the holding of the animal in strict quarantine for varying periods of time. As to whether or not this is advisable should be left to the discretion of the official in charge of the State regulatory service, and he should act only after carefully weighing every side of the question, not failing to take into consideration the responsibility of the owner and the character of his premises. There are comparatively few breeders who are fitted, temperamentally or otherwise, to maintain cattle under the Bang system, but there are conditions under which we are justified in permitting this to be done, and, as already indicated, we must be sure that no one, even the owner himself, is suffering an injustice thereby.

In attempting to meet the requirements of my subject I have tried to impress the real necessity of sanitary regulations in the gigantic task of controlling and eradicating this insidious disease. But there is another side, as to the manner by which these regulations help to accomplish our purpose and which I think is frequently overlooked, namely, the educational effect. Constructive regulations have a wholesome influence on those whose interests are involved and will cultivate a desire to ob-

tain more information. It has been my observation that whenever a person becomes sufficiently interested to inform himself on matters of this kind he ultimately becomes a cooperating factor.

The question of tuberculosis is having a most decided influence in the production of breeding and dairy cattle from a commercial standpoint. Those herds, communities or States which are able to offer the greatest protection against tuberculosis are beginning to attract the prospective buyer, assuming, of course, that the quality of the cattle is of equal merit. The situation as I am able to view it offers an opportunity for the Southeastern States.

SETTLING WITH THE OWNER

An auto dashed along a Texas country road and, rounding a curve, came suddenly upon a man with a gun on his shoulder and a weak, sick-looking dog beside him. The dog was directly in the path of the machine. The chauffeur sounded his horn, but the dog did not move until he was struck. After that, he didn't move either.

The car stopped, and one of the occupants got out and went back. He had once paid a farmer ten dollars for killing a calf that belonged to another farmer, and this time he was wary.

"Was that your dog?" he inquired.

"Yes."

"Looks as if we had killed him."

"Certainly looks so."

"Very valuable dog?"

"Well, not so very."

"Will five dollars satisfy you?"

"Yes."

"Well, then, here you are." He handed the man a five-dollar bill, and added, "I'm sorry to have broken up your hunt."

"I wasn't goin' hunting," replied the owner of the dog.

"Not going hunting? Then what were you doing with the dog and the gun?"

"Goin' down to the woods yonder to shoot the dog."—*Everybody's Magazine.*

ADDRESS OF THE PRESIDENT OF THE NEW YORK STATE VETERINARY MEDICAL SOCIETY¹

By D. H. UDALL

Ithaca, N. Y.

THIS is the thirty-second annual meeting of our society. For nearly one-third of a century, men—some of whom perhaps are here today—have met to advance the interests of the profession and the general welfare. Each decade has brought its own particular progress and decline, but at the close of each, one has been able to look back upon achievements that surpassed the most hopeful expectations.

As an association we are interested in principles that affect the profession as a whole, rather than the fortunes of any one group. We are concerned with those influences that advance the value and importance of our service.

Perhaps the chief influence for progress in the past thirty years has been a constant growth of education, an improvement in the development of the intellectual power possessed by those who sought learning in veterinary science. This has come through changes in an educational system that fitted pioneer conditions, and that covered a notable period in the history of our profession in America, made so by the names of a few whose influence and wisdom are permanent. But the closing days of this system, like those of many another period, brought a legacy of a different character. No learned profession has in recent times been so much of an educational outcast as ours. Since the evil is now corrected, nothing is to be gained by a recital of details. But we continue to suffer from its effects in the form of a low public estimate of the veterinarian. One has only to recall occasional specimens of our late army to appreciate the intellectual and personal inferiority that has encumbered the profession. Their origin is a mystery. No one here may take offense, for their haunts do not include gatherings of this kind, but they do yet, in too many communities, carry the burned-out torch of a dead generation. This estimate of the veterinarian chiefly applies to those in general practice, to those

¹ Presented at the thirty-second annual meeting of the New York State Veterinary Medical Society, Syracuse, July 26, 1922.

who constitute the great majority, for it is in your ranks that the derelict has operated. This judgment is far-reaching in scope; it has become almost a tradition. And while many enjoy the rights, privileges and honor pertaining to a learned profession in their own communities, we all feel, in various ways, the general effect of an untrained professional ancestry. It is as hard to dispel as the conception that night air is dangerous, and unfortunately is not confined to those outside the profession.

Certain outstanding colleagues develop chills over the possibility of an organized expression from the practitioner. The feeling that you are bound to commit a fault can not be dispelled. A few years ago I was consulted on the selection of topics for the section on practice in the A. V. M. A. I suggested "State Medicine in its Relation to the Practitioner." After apparent consultation with the proper authorities (they still retain the authority), this subject was rejected on the pretext that it was not of sufficient importance to merit a place on the program. It is superfluous to add that my counsel in such matters has not since been requested. The fact that "State Medicine" did have some interest was demonstrated later in a safer environment.

A few years ago, before giving any thought to this phase of veterinary science, I was surprised to hear a representative of one of our large universities state that he was in search of a man to take charge of the work on diseases of animals and that he would not have a veterinarian. Veterinarians, said he, are always at loggerheads with one another and he proposed to secure an animal pathologist. There is some compensation in observing that his selection has acquired national fame in the field of absurdity.

The evident conception of our State Department of Education of what constitutes a veterinarian under the law, is not flattering to one's pride. Of course some of this may be charged to the reactionary regime of that department, so fittingly described in recent numbers of the Druggist Circular.

This recital is not to condemn or extol any department, bureau, or individual, but to illustrate principles that merit the serious thought and judgment of all. It is no exaggeration to state that as a group we are poorly educated in the problems that affect the profession as a whole, and impotent as an active

influence in their solution. It is a logical sequence that we accept the verdict of others. And while such verdict is usually the result of honest opinion, it sometimes lacks the wisdom of broader counsel.

This situation is one of the fruits of an educational system that has passed, and even though you are not a part of its product, the shadow is all-inclusive. The small size of our profession and the comparatively small number of immortals who have honored its past in this country, place upon us a greater responsibility to maintain its ideals and establish its just position. The professional experience of a veterinarian is almost entirely individualistic; with few exceptions he operates alone and is exposed to the dangers of seclusion. Knowledge that does not come his way may remain unknown. Advantages that are not thrust upon him he often fails to enjoy. His wrongs, real or imaginary, are too often opposed by futile oratory. This experience develops individual independence and resourcefulness, but these alone are insufficient in our complex, modern civilization. The age of individualism has passed. The challenge of our time calls for harmony of effort, aggressiveness in the use of public facilities for the solution of daily problems, enthusiasm for learning, and frequent submission to instruction from others. This is the path traveled by men who assemble in all branches of learning, as you have done here. Without this spirit the first flash is the last, associations fade, new knowledge accumulates in a discouraging mass, and the intellectual epitaph is at hand. Professional education is a cooperative function, complex in nature, and terminated by indifference.

Some of our new educational problems are well expressed by Sir George Newman in an address entitled "The State and the Future of Medical Practice," presented at the 88th annual meeting of the British Medical Association. It reads in part as follows:

Consequent new relations between State and doctor have brought profound changes. They divert, in a handful of years, the whole course of applied medicine from its century-old pathway. They do not abolish the private medical practitioner, but they bring him in a different relation to the State. Their present and future relation must be confirmed and made good on both sides, for, on the one hand, the profession is conscious of

new obligations, both those imposed by law and those imposed by a sense of what is demanded by the civilization in which they live; and, on the other, the State is conscious, as never before, of the community's need of the profession's help if sought on the right terms and given in the right spirit. The greatest need on both sides is understanding. Value is the result of the application of mind and matter. The new problem is for State and profession to come to a realization of the principles which should govern their inter-relation. It is an association peculiarly difficult. For historical reasons the State (which means for the present purpose all authorities, local as well as central, concerned with health) has seen *prima facie* in the profession a body insistent upon the privacy and individuality of its work, the sanctity of its traditions, the freedom of its engagements. Correlatively, the profession has seen in the State an organization apparently devoted to the infringement of these traditions and incapable of putting anything worthy in their place. It has been suspicious and mistrustful of what it considers to be unnecessary intervention. It has feared the imposition of some east-iron system, some form of so-called "nationalism," the institution of a whole-time civil service, which might in practice make the practitioner of medicine servile, dependent and fettered.

What can improve the relation? The answer to this question seems to be—a larger measure of understanding by the doctor of the business of central and local government as representing the whole community, and by the State and its officers and representatives, high and low, of the history, development, and genius of professional character. The doctor should know something of the respective functions of Parliament, of the Cabinet, of the Treasury, of the dozen departments dealing with health problems as subordinate to their main functions, of the Ministry of Health (medical and lay), and its Medical Consultative Council. Further, he should know the meaning of the English system of local government; how it is evolved; why the country is divided into shires, boroughs, urban and rural districts and parishes, and what the main purposes are of the respective bodies providing for health, pensions, Poor-law, education and insurance. For it is only by such knowledge, inspired by the historical spirit, that the doctor can obtain a grasp of the machinery by which and through which he can render his communal service to the State. He will discover, incidentally, the working of some of the great principles of representative government and the guarantees of its freedom. The layman should learn so much as he can of professional tradition and sentiment, of the scope and opportunity of voluntary work which touches the profession, of professional organizations, and of their history and relation to each other.

Such knowledge on both sides has a direct bearing on the

effective working of the extended relations between the profession and the State which it is now recognized are inevitable. It would enable doctors to understand those necessary and, at first sight, rather remarkable limitations of Government action, which at present he deems to be merely stupidity. For instance, in official work regard must be paid to uniformity, to a "national minimum," to what is practicable rather than what is desirable, to the restrictions of the law, and to public economy. The layman in his turn will learn why doctors are jealous of their *private* practice, * * * of the whole personal nature of their relations with their patients, and of professional honor, integrity, and etiquette. These matters are not merely expressions of idiosyncrasy, prejudice, or narrowness of mind. They have behind them a long history, sound reason, and something of a philosophy. Some of them may be vestigial remains of a dead past; others have come to us, living, virile, and purposive, across 2500 years from the days of Hippocrates.

The general effect of this suggested change of outlook would be that the doctor become more political in the true Greek sense, and not with any partisan or meretricious meaning, but rather in the sense in which man was described as a political being, conscious and considerate of the community in which he lives; and Whitehall and local authorities would realize how far short they are of full understanding of the profession, with whom they must work, and of its growing cohesiveness, its quest of truth, and its undying spirit of "love of humanity associated with love of craft."

This masterful discussion of the principles of modern applied medicine contains for us wise suggestions. It offers a precedence to inquire and a memorandum of topics adaptable to our institutions and our situation. How many of us are familiar with the public organizations through which we function; the authority for their establishment, the scope of their power, the influences to which they are susceptible, the titles or the names of their personnel?

Within the scope of this educational program may well be included several topics that are the subject of much talk, that exert a profound effect upon our reputation, and that we as a society have largely ignored.

Perhaps the chief of these, the one that has reflected the most harm, is that of moral delinquency for mercenary purposes in the performance of public duty. No less a person than the Chief of the STATE Bureau of Animal Industry informed the New York Agricultural Conference Board in the presence of

one of your committees that in 1918 the tuberculin test of every private practitioner in the State was tabooed throughout the country. This statement was challenged by a breeder who knew better. But it reveals that from some quarters we are not even credited with sufficient self-respect to react against aspersion of character; that we will patiently function as a general repository for all suspected or real acts of dishonor that fall within the theater of our operations.

We may well disclaim perfection of character, the extent of our fault we thoroughly comprehend; it is not limited to any single group, but its capital stock has been tremendously watered by outsiders. In self-defense, in the interest of our moral and professional reputation, and in support of efficient and honest administration, this Society should organize behind a definite constructive program. Our first duty is to increase membership until it includes every eligible man in the State who is not a hermit and does not proclaim the faith of isolation practiced by the Druids. One year ago an apparent lack of interest was attributed to disharmony. This diagnosis is wrong. Disharmony may appear, but this Society is not now in that stage of development. Apathy is a better word. Authorities in agricultural organization chide us with lack of leadership. Nothing is to be gained by consultation. Even laymen have made the diagnosis. What is needed is a change of atmosphere and a little more exercise of community spirit.

The results accomplished by your committees through discussions with the Commissioner of Farms and Markets, and representatives of agricultural organizations have convinced them that you stand for principles as opposed to superficial interests. We are fortunate in the personality of these men, who have recognized in your committees a type of professional consultant bringing high ideals and sound advice. They welcome such counsel and they will unite with us in the support of any program for the advancement of veterinary science. We have a common purpose. Such union promotes understanding. We profit by their strength, and they by our counsel. No greater opportunity or higher obligation has ever come before this Society than that involved in the promotion of this policy.

The statement of Sir George Newman, that the problem of realizing the principles which should govern the inter-relation of the State and the profession is difficult, will meet with few

denials. You are vitally interested in the principles to be established in the State of New York. The time seems to have passed when disagreement on principle is interpreted as a cry over the loss of a job. Better understanding has shown that our motives are worthy of our enterprise—the preservation and development of a profession essential to the control of disease and the promotion of an industry fundamental to all nations that are not vegetarians. This is our motive, and this we accept as the motive of the most enthusiastic exponent of State medicine, notwithstanding recent information that indemnity discriminations are necessary to *keep busy* regular employees. What merit is there in a regulation for a Bureau that makes no higher call on the taxpayer than insurance against loafing? When did the government establish the principle of voting a subsidy from our left-hand pocket to stifle a fundamental enterprise that it has fostered from our right? This tangle between State and private veterinary service in New York is due, not to a defective law, but to a perverted bureaucracy which vacillates between individual favoritism on the one hand and meddlesome, restrictive paternalism on the other. Until better stability develops it will continue to malfunction in the administration of both public and private service for the control of animal disease. This, gentlemen, is a theme worthy of careful thought and candid debate. I would present a parallel drawn by Professor G. F. Warren to illustrate the identity of the principle involved here, with that involved in the operation of national banks and the inspection of grain for export.

National banks are conducted by private enterprise; they are accredited by the government, and are subject to inspection and supervision by Federal employees. Grain for export is classified by inspectors who are registered by the government. But the government does not classify the grain; this is a private matter between the inspector and the exporter. Registered grain inspectors, like bankers, are subject to scrutiny by Federal agents who are not known and whose arrival is not announced. The principle that the government should engage to perform the actual work of a vast enterprise to the derangement of a private service far better fitted by virtue of numbers, experience and location, is indefensible under our form of government. It invites favoritism and discrimination through lack of employees; the work at best is fragmentary; it is unduly

expensive and its reaction on the development of an essential profession is destructive. Would not more be accomplished in this State by a cooperative plan that would encourage and utilize private enterprise instead of eliminating it? If another plan is better adapted to other States, that is not our affair.

Recent events seem to indicate a more favorable attitude towards the effective utilization of all the different elements that have a common objective. There would seem to be no legal or constitutional objection to organizing along the lines followed by bankers and exporters. If my information is reliable, the agricultural industry of this State favors such a plan. The National Secretary of Agriculture has approved of the principle, and the Chief of the Federal Bureau of Animal Industry writes your President that where you find reactors in fully accredited herds the Bureau is in sympathy with and favors payment of indemnity. Having agreed on the principle, it would seem that its operation could not be indefinitely delayed.

With this brief outline of a few of the more important questions incidental to our service to the public and the State, I would commend for your thought the words of wisdom spoken by that older Cassius:

"Men at some time are masters of their fates:
The fault, dear Brutus, is not in our stars,
But in ourselves, that we are underlings."

BLACKLEG VACCINE

From August 1, 1922, the Canadian Department of Agriculture has discontinued the manufacture and sale of blackleg vaccine. The distribution of this vaccine was undertaken many years ago with a view to encouraging owners to vaccinate their cattle against blackleg.

Blackleg vaccines are now manufactured by a number of commercial institutions and can be purchased without difficulty either direct from the manufacturer or through local agencies, veterinarians, druggists, etc. Furthermore, blackleg vaccine is now prepared and sold in different forms and the newer products, such as blackleg aggressin and blackleg filtrate, are replacing to some extent, the old blackleg vaccine in the form of pills, pellets, and threads.

The U. S. Department of Agriculture also ceased the preparation and distribution of blackleg vaccine on July 1, 1922.

VETERINARY WELFARE ¹

By N. S. MAYO, Chicago, Illinois

THE WELFARE and progress of our profession depend ultimately upon the ability and efforts of each individual member. There is no royal road down which progress marches joyously dragging unwilling and lagging members along. It is true that a few hope to make some progress through the efforts of others, but their advance is not great. Each individual must make some progress or go backward. There is no standing still.

The welfare and progress of our profession must begin at home, that is, with the individual. Every member of our profession should realize the responsibility that is his. He is the representative of our profession in his community, and that community will measure the veterinary profession largely by the standard set by the local veterinarian, professionally, ethically, socially and by the service he renders to that community.

Veterinary welfare also depends upon the opportunity for service and the real service that the veterinarian can render to humanity. The pecuniary return is important, but there are other things besides money that make for our welfare also.

The first essential to our welfare is the general and technical training of the members of our profession. Upon one's general training, as well as technical, will we be measured, at least in comparison with the so-called learned professions. We know that the standards of training are higher than ever before, and that the facilities and equipment are better and much progress is being made in the fundamental training for our profession.

Another important factor in the progress of our profession is the increased information available that enables us better to solve the many professional problems that we encounter. Research workers are adding their scientific contributions that are of great practical value. I can not omit the splendid work of Dr. Maurice Hall in demonstrating the value of carbon tetrachlorid for the treatment of intestinal roundworms in animals and man. Every practitioner can do his part by contributing to association meetings such as this, or sending to the veterinary

¹ Presented at the Missouri Valley Veterinary Medical Association meeting, Omaha, Nebr., July, 1922.

journals the results of his own research and experience in everyday practice. There is room for great improvements here and an opportunity for every one to contribute to the welfare of the whole.

Another great factor in our professional welfare is the establishment of cordial relations with the farming and livestock industries upon which our profession is dependent. This should be done not only by our individual bearing to others in our daily contact but through various agencies that are working to advance the farming and livestock industries, farm and livestock organizations, county agents, the local press in rural communities, as well as livestock and farm papers of general circulation.

Harmony is absolutely essential to welfare and progress. Just as surely as home life is ruined by quarrels and controversy, so are professional progress and welfare ruined by strife within our ranks. Nothing in this world is absolutely perfect. If you know of errors that need correcting, go at it courteously and fairly, straight to the heart of the matter, and every one will appreciate your efforts to make things better in the proper way, and you will have the assistance and support of all fair-minded men.

Other important factors in our professional welfare are our professional associations. It is our duty to join such associations and unite our efforts with our professional associates for the advancement of our professional interests in every direction. In union there is strength. By our associations and their work is our profession judged in the State and nations outside of the community that measures our individual efforts. Every veterinarian should join the local veterinary association, the State association and the national association, for they afford the best opportunities for advancing our interests and promoting our welfare as a whole.

Our profession is just emerging, or possibly better said, just beginning to emerge from a serious depression that has affected every one, not only financially but psychologically. I do not think it has hit us harder than it did the farmer and stockman, but certainly hard enough. Quite a few veterinarians gave up their profession and entered other lines of work; the attendance in the veterinary colleges was greatly reduced, and we all felt

blue and "bolshheviki." It was, however, a world-wide depression that is gradually disappearing. Such conditions occur at times. There are some of us who recall a more severe period of depression in the early nineties, that still have painful memories. We lived through it, and we believe that we profited by the experience.

We believe that times are improving materially and that the outlook for our profession is good. There is no country in the world that is so favorably situated, economically, socially and politically, as the United States of America. There is no country in the world where people live so well as we do, or have greater opportunities for enjoying the real pleasures of life. So let us be optimists. Let us strive to improve ourselves in professional lines by attending association meetings, and by taking and reading the best veterinary literature available. Let us be charitable, sympathetic and helpful to others in our professional and outside of it. Let us give the very best service possible to our clients. Let us do our work to the best of our ability and conduct ourselves as professional gentlemen, and the future welfare of our profession will be established beyond question.

TRY IT AGAIN

Here's to the chap
With the smile on his map,
Though fortune has dealt him a thunderous rap
And knocked him clean on the rear of his lap—
Whose only remark is, "Gee whiz, what a slap!
I'll try it again!"

I'm there with the guy
With the gleam in his eye,
Though Fate has let loose a stiff punch in the eye,
And has scattered his pride all over the sky,
Whose only retort is "Doggone it if I
Don't go ye again!"

I'm strong for the brick
With the courage to stick,
Though Failure has hounded him like the Old Nick,
Who cries out at last, "Now I'm on to the trick!"
And camped on his trail when the going was thick,
Let's try 'er again!

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

PARALYSIS OF THE PENIS IN THE HORSE

By JOHN W. ADAMS

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Philadelphia, Pa.*

INABILITY to retract the penis is seen most frequently in the horse. During the late World War hundreds of cases occurred among the horses along the lines of battle, and while the causes are conjectural (embolism, thrombosis, lesions of lumbar cord or meninges, peripheral neuritis, etc.), the affection seemed to be in some way intimately associated with overwork, underfeeding and exposure to the rigors of winter weather.

The typical case is neither a paraphimosis nor a phimosis, but is simply a paresis or a paralysis of the retractor penis muscle.

Medical treatment is of no value. The surgical treatment recommended has been amputation, but as this is uniformly followed by stricture of the urethra, dilation of the bladder, and sooner or later death of the patient. Regardless of the method of amputation, this method of making a horse presentable is but a temporary expedient.

In 1906 I had occasion to excise numerous papillomata from the interior of the prepuce and skin covering the penis of an old, undersized grade stallion used exclusively for draft. The wounds healed promptly, but from that time the horse could not fully project the penis. In fact, so much of the skin covering the penis between the glans penis and orifice of the external prepuce had been removed that subsequent cicatricial contraction limited protrusion of the penis by approximately one-half.

This unlooked for result suggested to me a means by which a paralyzed penis might be mechanically held within the outer prepuce and render amputation and resulting stricture of the urethra unnecessary. As cases were presented during succeeding years, I experimented to ascertain the amount, location and shape of skin to remove, the best method of approximating the

skin around the denuded area and of holding the penis till healing had taken place. Since 1910 no important modification has been made and I will describe briefly my present technique of "reefing" the skin of the penis. A sailor shortens sails by taking up a fold ("reef") and tying it in place,—he does not cut the tied fold away. I shorten the investing skin of the penis and limit protrusion by taking up a circular cuff or reef, suture it in place, but do cut away the reef.

Reefing the Penis.—Indicated in geldings with paralysis of the penis. Cast on table or ground. Chloroform anesthesia desirable but dispensable. Wash penis and prepuce. If the penis is rigid through engorgement of corpus cavernosum it can be readily softened by bending and manual compression till it is flaccid and can be pushed well back into the external sheath. With the penis fully extended and a catheter within the urethra, make a circular incision through the skin just anterior to the base of the edematous fold (inner prepuce) that encircles the glans penis some five or six inches from its end. A second circular incision is then made around the base of the penis. The distance between these two circumscribing incisions will depend upon the width of the fold that you can pinch up on opposite sides of the penis without rendering the skin on both sides of the fold so tight that the sutures will tear out.

The position of the distal circular incision is fixed. The distance from it to the proximal circular incision is approximately two-thirds of the distance from the end of the sheath to the end of the pendant penis. In other words, if the penis hangs twelve inches out of its sheath, the width of the cuff to be removed will be about eight inches.

The hemorrhage will be negligible, because the large veins in the loose subcutis need not be severed. Join the circular incisions by one longitudinal incision and dissect away the cuff, avoiding the large veins lying upon the surface of the tunica albuginea.

Remove the catheter. Join the edges of the skin by four mattress tape sutures equally disposed around the penis. Place three interrupted silk sutures between each two tape sutures. Dust the line of suture with an antiseptic and astringent powder. The end of the penis should now project five to eight inches beyond the prepuce. When healing has taken place some two to three weeks later, the end of the penis should come to rest

some one to three inches beyond the sheath, so that urination will occur outside of the sheath.

A triangular suspensory diaper of muslin attached by the corners to tapes passing around the loins and between the hind legs will help support the penis until cicatrization has occurred. The tape sutures should be removed in about fourteen days.

This operation gives permanent results; is not followed by stricture because the urethra is not invaded; is not followed by balanitis because the urine is voided outside the sheath. A stallion with paralysis of the penis can get an erection and is not prohibited by the paralysis alone from breeding mares. If this operation is contemplated, the stallion should be castrated a month or more before reefing the penis is done.—*U. of P. Bulletin, Veterinary Extension Quarterly, No. 7, July 1, 1922.*

INCREASE IN PIG CROP MAY OFFSET PORK SHORTAGE

A net increase of 14.5 per cent in the number of young pigs produced last spring in the Corn Belt States is shown in a special pig survey by the United States Department of Agriculture. This increase may overcome the shortage of meat stocks.

The survey shows a gross increase of 22.8 per cent in the number of spring litters this year as compared with the number of litters born last spring, but the average number of pigs saved per litter is 7 per cent less than last spring. The April 1 brood sow report of the Department indicated a net increase of 15.6 per cent in pig production this spring over last year.

Stocks of pork products other than lard in storage May 1 were 33 per cent less than the five-year average, and 26 per cent less than a year before. Lard stocks May 1 were 16 per cent less than the five-year average and 37 per cent less than in 1921. Stocks of other meats were correspondingly low.

The survey indicates a prospective increase of 49 per cent in the fall farrowings in these states over last year.

The survey is based upon about 200,000 schedules received from farmers in the Corn Belt States which produce about 70 per cent of the pigs in the United States, and from farmers in the Eastern and Southern States.

ABSTRACTS

INVESTIGATIONS RELATIVE TO INTERCHANGEABLE VACCINE IMMUNITY AND FOOT-AND-MOUTH DISEASE IMMUNITY IN CATTLE AND GUINEA-PIGS. P. Uhlenhuth and W. Bieber. *Klin. Wehnschr.*, 1 Jahr, No. 13, April 8, 1922. (Translation.)

While carrying out experimental studies with vaccine, we decided to include the question of the immunizing relations between foot-and-mouth disease and vaccine in our investigations. Although the Prussian Commission for Investigating Foot-and-Mouth Disease (Loeffler, Frosch and Uhlenhuth) had given a negative answer to this proposition in 1898, reports were constantly appearing in the literature, which declared that cattle having recovered from vaccine infection always possessed protection against foot-and-mouth disease.

There was always a possibility that by the simple vaccinations used by the above named commissioners, no protection was afforded against foot-and-mouth disease. Three young cattle were therefore injected intravenously with larger amounts of vaccine lymph. These three cattle were treated in the same manner from August to October, 1921, becoming highly immunized. They had never been exposed to foot-and mouth disease. Two of them were then placed in a stable at F. near Munich, where foot-and-mouth disease existed in a severe form, that they might be exposed to the disease by natural infection. The test cattle stood between cattle that were very sick (one of these died). Material from the mouths of the sick cattle was repeatedly brushed into the mouths of the test animals. Except for a slight elevation of temperature which quickly disappeared, these young cattle showed no indications of foot-and-mouth infection or of having contracted any other disease. All the remaining cattle in the stable became sick. The control and the continuous observations of the test animals were made by District Veterinarian Rasberger of Munich through the kindness of the Bavarian Ministers. These results led us to continue our investigations. A large number of cattle were highly immunized against vaccine, some intravenously, some intraperitoneally and others by means of scarification, while a few were treated simultaneously with intravenous injections and

cutaneous applications. Various amounts of serum were used upon individuals of the several lots. It should be mentioned here that the intravenous injection of large amounts of serum often led to threatening symptoms immediately after the injection (tumbling about, distressed breathing, etc.). The cattle receiving the largest amounts were each given 5, 10 and 10 c.c. of glycerin lymph of the usual dilution intravenously. It was then discovered that the skins of animals that had received but a single preliminary treatment were perfectly immunized at the time of later scarification, even weeks and months later. The corneas of the cattle which we examined with Prof. Grüter of the eye clinic, even those from cattle receiving three injections as preliminary treatment failed to show complete immunity, although they gave a reaction that was much lower than that given by the eyes of controls. In general the vaccine process ran a longer and lighter course on cattle than it did on rabbits (there was less tendency to ulcer formation), a fact which we proved by comparative tests with several samples of lymph.

We noticed almost invariably, after intravenous or cutaneous treatments that pustules, papules and red spots, similar to those produced in rabbits and guinea-pigs by vaccinating, contained vaccine virus, would appear within or around the mouths of the test cattle. These slowly disappeared without leaving any scar.

The third treated bovine was sent to F. near Munich, where with six other young cattle, all highly immunized against vaccine, it was placed in a stable near Marburg where foot-and-mouth disease had just appeared. Here they were exposed to natural infection, and during the whole test were carefully observed by the writers. All of the cattle contracted foot-and-mouth disease. Most of them, however, had the disease in a very slight form (no blisters formed between their claws. A portion of the highly immunized cattle were then injected intraperitoneally with germ-free lymph for the purpose of obtaining serum to be used in the treatment of patients sick with smallpox.

We next tested the variability of immunity on guinea-pigs. After inoculating on the skin of the metatarsal region (with slight cuts) local lesions appeared upon the guinea-pigs similar to those produced by inoculation with foot-and-mouth virus. The vesicles remained longer, 3 to 5 days, while those from

foot-and-mouth inoculations usually become fully developed in 24 hours. The vaccine vesicles usually remained in the metatarsal region while those of foot-and-mouth disease frequently extended to the toes. At the right time rich, clear, lymph may be drawn from the vaccine vesicles. Through continuous re-inoculation of such vesicle contents we have produced a guinea-pig strain ("cavine") which remains unchanged when used on these animals and leads to the development of beautiful vesicles.

We also learned that guinea-pigs are useful animals upon which to execute vaccine studies. We used them in intracutaneous experiments (for standardizing lymph, etc.). The 16th and 20th passages were rubbed upon the scarified skin of a young bovine, but showed no increase in virulence. This experiment was repeated to see if the serum had lost any of its virulence for cattle. Through cutaneous inoculation on the metatarsal skin and upon the skin of the posterior part of the abdomen of guinea-pigs, which treatment resulted in the formation of vesicles, also through intraperitoneal and subcutaneous inoculations of germ-free lymph, we have prepared many series of immune guinea-pigs. No abscesses follow the use of germ-free lymph. Guinea-pigs treated in the above manner are fully immune to vaccine. They will, without exception however, develop foot-and-mouth disease if foot-and-mouth virus is rubbed upon the scarified skin over the metatarsal region. The course of the disease with these treated guinea-pigs is precisely the same as that shown by the controls that received no preliminary treatment. On the other hand we have infected guinea-pigs with foot-and-mouth disease after they had been immunized against vaccine. They developed blebs and vesicles just as did the untreated controls. Simultaneous inoculations with vaccine virus upon one foreleg and foot-and-mouth disease virus upon the other foreleg of the same guinea-pig, resulted in perfect inoculation results in both instances. Simultaneous inoculation of one foreleg of a guinea-pig with foot-and-mouth disease virus, giving intraperitoneal injection of vaccine virus also resulted successfully.

Although rabbits are less suitable for these tests than guinea-pigs, the results obtained by subjecting them to identical tests with guinea-pigs were always the same.

No interchangeable influence between foot-and-mouth disease

immunity and that derived from vaccine virus could be demonstrated in our experiments. The positive results obtained with two young cattle at F. near Munich we are at present unable to explain.

H. J. WASHBURN.

CANCER IN HORSES. E. Césari. *Recueil de Médecine Vétérinaire*, vol. 98 (1922), p. 171.

During the course of a study of the etiology of cancer, 20,000 mares, 16,000 geldings and 3,600 stallions were examined post mortem at an abattoir with the view of obtaining data on the frequency, locations, etc., of cancer. Systematic exploration was made by palpation, and if necessary, by incision of the testes, ovaries, udders, kidneys, adrenal glands, lungs and livers. Frequently, small cancerous nodules were found imbedded in the organs, which ordinarily would escape attention. Malignant tumors only (epithelioma) were studied and counted: 184 or 0.46 per 100 were found. Cancers occurred most frequently in stallions, the testicles almost always being affected first (1.38 per 100). In geldings the kidneys were most frequently invaded (0.22 per 100). In mares, the udders were first and kidneys second in the number of cancers. By far the bulk of the 184 cases were included in the 50 testicles, 45 udders and 62 kidneys. There were but 2 cancers in the ovary and 1 in the uterus. Diagnoses were always checked by histological examinations. Dark-coated horses have cancers about three times as often as light-coated ones. The horses killed at the abattoir were mostly past 15 years of age, but four cases of cancer were observed in horses under 12 years. On the subject of etiology nothing was recorded.

W. N. BERG.

IS IT NECESSARY TO KILL DAIRY CATTLE WHICH REACT TO THE TUBERCULIN TEST? A. Calmette. *Rev. Vét.*, vol. 74 (1922), no. 6, p. 356.

The advice of Prof. Calmette was sought regarding a measure proposed by the Council of Hygiene of the Department of the Aisne requiring the tuberculin testing of all cattle furnishing milk for public consumption and the slaughter of all reactors. Viewing the problem purely from the sanitary point of view Calmette does not believe that the measure is acceptable in its present form. The following points are brought forward in support of this stand:

The tubercle bacilli adapted to the bovine species have acquired specific morphological and cultural characters and pathogenic qualities clearly differentiating them from human bacilli. They are rarely encountered in tuberculous lesions of man (4 to 10 per cent of tuberculosis of children and 0.3 per cent in adults). Statistics obtained by C. Guérin in 1910 showed that the mean proportion of animals reacting to tuberculin in France was then about 16.5 per cent; more recent figures show that the situation is still more serious. The proportion of reactors of dairy cattle permanently stabled exceeds 40 per cent and in dairy breeding cattle the percentage ranges from 30 to 16. On December 20, 1921, there were in France 18,264 infected farms and 144,065 tuberculous cattle. The total bovine "population" in France in 1920 was 12,767,720 and the number of tuberculous cattle not less than 2,000,000. If all French cattle reacting to tuberculin were held for slaughter the production of milk would be reduced one quarter and all other conditions remaining the same the price of milk already high would increase in the same proportion without resulting in any appreciable advantage to the public health. The latter can be more effectively protected by requiring that milk should be placed on sale only after it is freed from tubercle bacilli by boiling except when it is produced by cattle frequently and regularly tuberculin tested and under the permanent control of veterinarians. The milk should be delivered in sealed vessels.

The problem of eradication of bovine tuberculosis should be regarded especially from the economic point of view and its solution should be the task of the veterinarian and the breeder. Success will not be attained by meddlesome and impracticable regulations but by a better organization of stable hygiene, by seeking out, isolating and early slaughter of animals with open lesions. It is inadmissible that cattle showing no apparent or clinically detectable lesions, whose mammary glands are not affected, whose milk does not contain tubercle bacilli and whose general condition is excellent can not be saved for milk production.

L. T. GILTNER.

NOTE ON THE PERCENTAGE OF TUBERCULOUS CATTLE. L. Sausseau. *Rev. Vét.*, vol. 74 (1922), no. 6, p. 362.

Sausseau calls attention to the fact that Calmette in his report (see above) has probably overestimated the prevalence

of tuberculosis in French dairy cattle. Tuberculin tests made by the sanitary veterinarians are confined to little more than the tests on farms known to have the infection. Save in rare exceptions, herds not suspected, are not tested. The official statistics give the percentage of reactors in known infected herds and not in all of the herds. The stables supervised by the Sanitary Service contain a higher average of tuberculosis than those on the outside and probably many of the latter are healthy. If all cattle were tested indiscriminately it would result in materially lowering the percentage of positive reactors. In Calmette's reference to the statistics of December 20, 1921, he assumes that all of the 144,065 cattle on the infected farms are tuberculous, whereas in fact only a certain proportion of these reacted to the test.

Sausseau does not wish to deny the ever-increasing prevalence of bovine tuberculosis but to correct the tendency to exaggerate the degree of infection of French cattle on the basis of exact statistics, but improperly interpreted. L. T. GILTNER.

A BRIEF ACCOUNT OF A DISEASE IN CATTLE SIMULATING HEMORRHAGIC SEPTICEMIA DUE TO FEEDING SWEET CLOVER.

F. W. Schofield. Canadian Record, vol. 3 (1922), no. 2, p. 74.

A cattle disease occurring in two forms, a hemorrhagic type and an anemic type, has been observed following the feeding of sweet clover. The feed was coarse and moldy and consumed either as hay or ensilage. No cases were found in animals fed fine ensilage or a fine hay free from mold. In the hemorrhagic type there are subcutaneous swellings, small at first but increasing in size until they attain a circumference in some instances of several feet and from 4 to 6 inches in thickness. The swellings are non-inflammatory (no heat or tenderness) and contain blood and plasma. There is no elevation of temperature, the pulse is accelerated and weak, appetite not entirely suppressed; visible mucous membranes blanched, gait is stiff, constipation present, posterior paralysis may occur. Clinically all that can be observed in the anemic type are pallor of the mucous membranes and lassitude. Death usually follows some operation, such as dehorning. The blood is thin and watery and fails to clot or clots very slowly.

At autopsy in the hemorrhagic type, the superficial swellings

are found to contain clotted blood, semi-gelatinous material and serum. Throughout the body there are innumerable petechiae and minor hemorrhages. In the liver small dark spots about the size of buck-shot occur, just beneath the capsule, the muscular pillars of the left heart show well marked ecchymoses. In the anemic type no large hemorrhages are found, but petechiae and ecchymoses may be found in any of the serous membranes. The carcass contains a small quantity of thin blood which coagulates very slowly.

Experimentally the disease was produced in calves and rabbits by feeding moldy sweet clover hay or ensilage. Bacteriologic examination of tissues from natural cases were completely negative for hemorrhagic septicemia.

L. T. GILTNER.

WINE IN SURGICAL ANTISEPSIS. L. di Lucca. La Fir. Med., 1921, no. 32. Abst. in Zeitschr. f. Tuberkulose, vol. 36 (1922), no. 3, p. 228.

Severe surgical infections (wounds, abscesses, phlegmons, open tuberculous lesions, etc.) were cured by treatment with the naturally pure wine from various sources and of an alcoholic content of 12-15 per cent. There was a surprisingly quick drying up of the purulent discharges and a luxuriant development of healthy granulations and this occurred when other antiseptics had failed. The wine was applied undiluted or in different dilutions as a wash for the parts or in tampons or packs. Continued or frequent washings were not necessary. Tuberculous lesions were likewise favorably influenced though perhaps to a lesser degree. The wine causes neither pain, burning nor irritation of the neighboring skin and is recommended largely in warm applications. Laboratory experiments are still being carried on.

L. T. GILTNER.

RESEARCHES INTO THE SEROLOGICAL DIAGNOSIS OF CONTAGIOUS PLEUROPNEUMONIA OF CATTLE. G. G. Heslop. Roy. Soc. Victoria Proc., n. ser., 33 (1921), pp. 160-211. (Abst. in Expt. Sta. Record, vol. 46, p. 582.)

This is the report of an extensive investigation of contagious pleuropneumonia of cattle, with particular reference to its serological diagnosis.

Following a brief review of the literature on the disease, preliminary cultural and filtration experiments are reported. It was found that Martin's peptone bouillon with the addition of 7.5 per cent of normal ox serum is the best medium in which to obtain primary cultures of the organism involved. Growth takes place under aerobic conditions with an optimum incubation temperature of 37° C. Cultures thus obtained are capable of filtration through a Chamberland F. filter candle if the culture is first diluted with from 1 to 2 per cent of Martin's broth (without serum). Growth in Martin's broth serum media is recognizable after approximately 21 days by slight opalescence, for the recognition of which it is necessary that uninoculated tubes of the same broth be incubated at the same time. Animal inoculation should be used to confirm the identity of the organism.

The agglutination test was found to be without value in the diagnosis of the disease, but the complement-fixation test, if carried out by the special technique developed by the author, yielded reliable results. The main difficulty in carrying out complement-fixation tests for the diagnosis of contagious pleuropneumonia is thought to be the prevention of errors arising in the test owing to the presence of conglutinin in the serum. Since the amount of conglutinin present in bovine sera differs very considerably, it is necessary to titrate each test serum separately to determine the proper quantity to use in the final test. An alcoholic extract of subepidermal tumor tissue from a diseased animal is considered the most suitable antigen.

THEORY OF TUBERCULIN REACTION. Rosenbach. Deutsch. med. Wehnschr., vol. xlvii (1921), p. 1581. Abst. in Amer. Rev. of Tuberc., vol. vi (1922), p. 105.

Tuberculin does not act directly as a toxin but activates the toxins derived from tuberculous foci. Only the activated toxin is injurious to the cells and produces inflammation. Therefore there results no reaction in healthy persons following tuberculin administration; and there is no relation between a positive reaction and antibody formation, because the latter's origin is from the complete, efficacious virus. The toxicity of tuberculin, Rosenbach, has been reduced by planting trichophyton on the medium, which at the same time does not diminish its immunizing qualities.

EFFECTS OF TUBERCULIN. P. M. Holst. *Tubercle*, vol. iii (1922), p. 240. Abst. in *Amer. Rev. of Tuberc.*, vol. vi (1922), p. 105.

The experiments of Römer and the phenomenon of Koch are discussed as to their bearing on immunity in tuberculosis. Koch's phenomenon is probably a manifestation of hypersensitiveness, while Römer's findings suggest that he produced a real immunity in animals. It is possible that the reinfection of animals, according to the method of Koch, may not result in a typical tuberculous wound, because many of the bacilli are carried away in the necrotic slough that appears at the point of infection. To determine this point tubercle bacilli were injected into animals intracutaneously in combination with diphtheria toxin; the toxin caused focal necrosis but the final result of the tuberculosis was not altered. By injections of tuberculin in combination with tubercle bacilli into tuberculous guinea-pigs the results were no better. It has not been proved that tubercle bacilli are able to form a genuine toxin capable of producing a neutralizing antitoxin when introduced into the organism. It has not been possible to neutralize the effects of tuberculin by incubating it with serum from tuberculous men and animals. To study the fate of tuberculin in the organism it was injected intravenously or intraperitoneally into normal rabbits and guinea-pigs; after varying intervals the animals were bled or killed and the serum was injected into the skin of tuberculous animals or was used on a very sensitive human skin for the Pirquet test. It was found that tuberculin circulates in the blood immediately after injection into the vascular system but it rapidly disappears thereafter. In another experiment, tuberculin disappeared from the peritoneal cavity rapidly and completely. Since Franceschelli showed that the total quantity of injected tuberculin can not be found in the urine till after a lapse of several hours, it is assumed that the substance must be stored somewhere outside the vascular system, since blood neither *in vitro* nor *in vivo* was found to bind tuberculin. Likewise, extract of fresh ox liver showed no power of fixing tuberculin. However, it is bound by living cells *in vitro*, as shown by using liver and brain substances; by boiling, the combination is easily broken up. Tuberculin, three hours after injection into rabbits and guinea-pigs, could not be detected in the lungs, kidneys, spleen or bowel contents.

To determine this the organs were ground and boiled with water and the filtered decoction was steamed down and pure alcohol was added. The precipitate was dissolved in water and injected into tuberculous guinea-pigs. Extracts of liver, prepared in this way, gave a slight necrosis after injection. Extracts from bones gave a distinct reaction; from muscles none. The reactions were always weaker than those from pure tuberculin. Controls were negative. It is concluded that the reaction which takes place *in vitro* by the binding of tuberculin in living tissue to a certain extent may take place also *in vivo*, and that the binding here is mainly effected by the bones. The circumstance that tuberculin can not be quantitatively recovered in the body after injection possibly means that the tuberculin now forms a new combination which we can not detect by our methods. This may also explain why we have not been able to find tuberculin in the tuberculous organism. Not until we obtain certain knowledge regarding the fate of tuberculin in the organism shall we be able to determine whether it is a true product of the tubercle bacilli or an artefact formed by the decomposition of the real toxin.

NEW OBSERVATION OF THE BIOLOGY OF THE CAUSATIVE AGENT OF FOOT-AND-MOUTH DISEASE. R. M. Allatorvosi Lapok, vol. 45, (1922), no. 8, page 54.

In Germany during recent years two promising methods have been worked out, which should prove of some value in the identification of the causative agent of foot-and-mouth disease.

Waldman and Pape (Berl. Tier. Woch., 1921, 30) observed that fresh lymph taken from a blister in the mouth of an infected animal will successfully infect the guinea-pig, heretofore believed immune. With Waldman and Pape's method, if the fresh lymph is rubbed into the posterior part of the sole of the pig's foot (plantar cushion), the skin having been previously scarified, blisters of the size of a pea will be noticed on the foot within 24 hours and within 3 to 5 days the condition becomes generalized and small blisters are seen on the volar surfaces of the feet, on the skin of the ears and in the mouth. The trustworthiness of this method has been approved by many (Ernst, Uhlenhuth, Titze). The practical value of this observation lies in the fact that the guinea-pig furnishes an economi-

cal animal for experiments in determining the value of Löffler's anti-serum as well as the blood of recovered animals.

The other promising method is that of Titze's (*Archiv. f. wiss. u. prakt. Tierheilk.*, 1921, p. 273, and *Berl. Tierarztl. Wschr.*, 1922, no. 4). He has successfully prepared liquid culture media in which he has been able to cultivate the causative agent of foot-and-mouth disease for four generations. The formula of this medium has been given only to his higher officials at the present, but from one of his works it can be seen that physically this medium resembles the lymph of the aphthous blister. After inoculation, 24 to 48 hours, the medium becomes cloudy, although no organism can be detected, either with or without stains. That the cloudiness is the multiplication of the organisms, however, was first proved because the artificially cultured medium, as antigen, with blood from recovered animals, gives positive reactions with the agglutination test; and second, because the injection of this medium into the blood of cattle produces specific antibodies; and third, because, although artificially infected animals show no symptoms of the foot-and-mouth disease, the animals do become immune against virus taken from hogs with the foot-and-mouth disease.

If further experiments corroborate his findings, Titze's discovery will be of great advantage economically, since with the artificial medium, immunization of animals may be done without danger.

M. BORSOS.

SECOND INTERNATIONAL CONGRESS OF COMPARATIVE PATHOLOGY POSTPONED

Information has been received from Prof. E. Perroncito, President of the Second International Congress of Comparative Pathology, that this congress which was to have convened at Rome, Italy, September 20, 1922, has been postponed because of unforeseen circumstances that make it impracticable to hold the meeting this year. It is probable that arrangements will be made for the convention of the congress at Rome in the spring of 1923. The date of meeting when decided will be given in a later announcement.

ASSOCIATION NEWS

TEXAS VETERINARY MEDICAL ASSOCIATION

The twelfth annual meeting of the State Veterinary Medical Association of Texas was held June 21 and 22. The body convened at the School of Veterinary Medicine, Agricultural and Mechanical College, College Station, Texas. A good attendance was recorded and many veterinarians were accompanied by their wives.

Dr. Mark Francis, Dean of the College of Veterinary Medicine, gave a very cordial address of welcome, which was responded to by Dr. R. H. Hodges, of Ranger. Dr. M. A. Peck, President of the association, Fort Worth, in presenting his address, recalled the early days of the association, its growth, and predicted for it a brilliant future.

The first paper of the afternoon session was a valuable contribution on the "Cooperation of the Veterinarian with the Live Stock Sanitary Commission," by Hon. J. E. Boog-Scott, Chairman of the Live Stock Sanitary Commission of Texas, Fort Worth. Mr. Boog-Scott spoke from the viewpoint of a sanitarian and an experienced stockman. He brought out many factors of unusual interest and many of which will tend to bring veterinarians, the Live Stock Sanitary Commission and the stock raiser into closer relationship. His paper created quite a favorable impression among the veterinarians present, and it is hoped that the association will hear from him again in the near future.

Dr. Harry Grafke, Fort Worth, Inspector in Charge of the B. A. I. in Texas, reviewed "Conditions in the B. A. I. Service." In his address he gave a very interesting and detailed report of the work being done by the B. A. I. in the State of Texas.

"Interstate and State Regulations" was the topic of a well written paper by Dr. Leon G. Cloud, State Veterinarian. Many points in the regulations were made clear by the State Veterinarian which had previously caused some confusion.

Dr. J. S. Watson, of Mexia, read a very carefully and thoughtfully prepared address entitled "Cooperation of the Veterinary College with the Practitioner."

Dr. W. G. Brock, of Dallas, presented one of the most valuable addresses of the meeting on "Canine and Feline Practice." This subject must have received much thought after close and careful observations in an extensive small animal practice. Dr. Brock has achieved quite a reputation as a small animal surgeon and his operative technique in some of the more common canine and feline operations was given in detail and evinced a high degree of skill.

"Hemorrhagic Septicemia and Mixed Infection" was ably discussed by Dr. P. P. Starr, of Gainesville. Dr. Starr presented the paper from a practitioner's point of view and many interesting things were offered that will be food for thought in dealing with these diseases.

A splendid article on "Experiences with Anthrax" was read by Dr. R. H. Harrison, Jr., Assistant State Veterinarian. This disease is gradually spreading to new areas in Texas and it behooves every veterinarian in the Southwest to be on the lookout for its appearance in his vicinity. The above paper was written after experiences with the disease in several of the largest outbreaks which have occurred in the State.

The annual banquet was held in the evening and was attended by most of the veterinarians, their wives and friends. Dr. N. F. Williams, of Dallas, presided as toastmaster at the joyous occasion.

The second day of the meeting was devoted entirely to clinics which were demonstrated at the College Hospital. Dr. R. P. Marsteller, Professor of Veterinary Medicine at the College, was clinician in charge. The clinic was varied and very extensive and apparently Dr. Marsteller and his associates had spared no efforts nor time in its preparation. Dr. A. A. Lenert, Associate Professor of Veterinary Medicine, handled the canine and feline clinic. Much interest was taken in the small animal cases, and the efficient manner which this clinic was handled enabled all to get the maximum amount of benefit from it.

Dr. R. C. Dunn, of College Station, gave a demonstration and lecture on chicken-pox. He covered the subject in a most creditable way, and had several infected fowls in the clinic for observation. The production and use of the chicken-pox vaccine was told in an exceptionally clear and impressive manner. Enterohepatitis in turkeys was also discussed in its entirety by Dr. Dunn, and before closing the clinic he was asked numbers

of questions pertaining to the two diseases. His talk impressed many of the veterinarians as to the necessity of becoming better acquainted with the rapid strides which are now being made in the diseases of poultry.

Dr. G. G. Graham, of Kansas City, made a talk on "Botulism" and clinched his lecture on the minds of the hearers by having all stages of the disease in evidence in a series of chickens. The usefulness of the antitoxin was shown in a case where a fowl had been given a prophylactic dose of antitoxin and later received a dose of the toxin. The same amount which was producing botulism in the other fowls had been rendered harmless to the first fowl by the use of the antitoxin.

Private practitioners gave demonstrations of their technique on several surgical cases. Dr. W. G. Gregory, of Fort Worth, did a cryptorchid operation which was one of the features of the large animal clinic. Many other cases were presented which were of vital interest to the veterinarian.

The success of the clinic was shown by a move being started to devote more time at the next meeting to clinics and reports of actual cases and observations from the field.

The association feels a deep sense of appreciation for the former officers—Drs. Peck, Smotherman, Scott and Blackburn—and to the members of the College faculty for the arrangements of such a practical meeting. The veterinarians of North Texas thank Mr. Geo. Mason, of Fort Worth, for his untiring efforts in obtaining a special Pullman and seeing to transportation.

Nine new members were received into the association. The following officers were elected for the ensuing year: P. P. Starr, President, Gainesville; W. G. Brock, First Vice President, Dallas; W. M. Thaxton, Second Vice President, Fort Worth; W. R. McCuiston, Secretary-Treasurer, Fort Worth.

W. R. MCCUISTON, *Secretary*.

MICHIGAN STATE VETERINARY MEDICAL ASSOCIATION

The summer meeting of the Michigan State Veterinary Medical Association was held at the Michigan Agricultural College, East Lansing, on June 28, 29 and 30. Although the weather was warm, approximately 200 veterinary practitioners from various parts of the State were in attendance. The commit-

tees in charge of the arrangements deserve much credit for the pleasure and satisfaction felt by all concerned as a result of their interest and foresight. The sessions were held in a tent pitched on the college campus. Under these conditions the environment added to the pleasure and interest in the meeting, as this college campus is considered by many as the most beautiful agricultural college campus in this country.

Dr. J. E. Wurm, President of the Association, opened the meeting on the morning of the 28th with an address which was of interest to every member present. The clinical program given in the afternoon proved unusually interesting and instructive, and the reception at the Armory in the evening was well attended. The formal address of welcome was delivered by Hon. H. H. Halladay, formerly State Commissioner of Agriculture and now Secretary of the State College of Agriculture. Dr. Wurm responded to Mr. Halladay in a very pleasing manner. The Hon. J. A. Doelle, the present Commissioner of Agriculture, gave a very interesting talk on the work of his Department. The evening's entertainment was concluded with the display of the moving picture film, "Out of the Shadows," after which refreshments were served.

The program on the 29th included various addresses: "Azoturia and Its Treatment," by Dr. L. C. Palmer of Brooklyn, Mich.; "Forage Poisoning," by Dr. B. A. Perry of Hastings, Mich.; "Laminitis and Its Treatment," By Dr. E. B. Cavell, Northville, Mich.; "Cooperation Among Veterinarians," by Dr. G. W. Cronkite, Saginaw, Mich.; "Tuberculin Test Ordinances in Cities and Towns," by Dr. F. E. Stiles, Battle Creek, Mich.; "Uniform Price for the Tuberculin Tests and Hog Cholera Vaccination," by Dr. C. C. Dauber, Sturgis, Mich.; and "The Horse Situation in Michigan," by Dr. Judson Black of Lansing, Mich.

The afternoon program of the 29th was especially interesting, since the ladies participated. Mrs. C. C. Schafer of Linden, Mich., and Mrs. J. E. Wurm, Pigeon, Mich., gave splendid addresses on the subject, "My Part in My Husband's Practice." The regular program was followed by a series of athletic feats beginning at 3.30 p. m. and a picnic on the college campus at 7 o'clock. It is needless to say that the picnic was well attended.

The members of the Association were favored on the morn-

ing of June 30 with an address by the President of the Michigan Agricultural College, Dr. David Friday. In his address he paid a tribute to the veterinary profession and the work it has accomplished in the United States. Among the features of the scientific program for June 30, the last day of the meeting, were addresses, as follows: "Acute Interstitial Nephritis in Foals," by Dr. E. T. Hallman of the College faculty; "Pathology of Lymphangitis," by Dr. F. B. Lambie, Midland, Mich.; "Milk Inspection," by Director T. H. Boughton of the Bureau of Dairying, State Department of Agriculture; a talk on the activities of the Bureau of Animal Industry, by Dr. U. G. Houck, Washington, D. C.; and a discussion of "Meat Inspection with Particular Reference to Small Municipalities," by Dr. E. P. Schaffter, inspector in charge of Federal meat inspection, Detroit, Mich.

The audience was particularly favored in the afternoon with a very interesting and instructive address by Prof. H. R. Smith, Livestock Commissioner, National Livestock Exchange, Chicago, on the subject, "National Tuberculosis Eradication Campaign." Immediately after the lunch hour, moving pictures were shown, including "Exit Ascaris" and "Hog Cholera."

All who attended this meeting went away feeling that it was one of the most successful meetings that had ever been held by the Association and all felt grateful to Mr. Halladay and the other College officials who took such an active interest in making the meeting a success.

U. G. HOUCK, *Recorder*

MAINE VETERINARY MEDICAL ASSOCIATION

The members of the Maine Veterinary Medical Association met at New Meadows Inn, Bath, Me., July 12, 1922.

The members and their wives arrived from different parts of the State and at noon sat down to a shore dinner for which the Inn is justly famous. The dinner was followed by a social hour on the lawn.

The ladies then departed on a shopping tour, which was unique in the history of such tours, as they spent no money—the stores were closed.

The meeting was called to order and much routine business disposed of.

Dr. R. E. Libby of Richmond and Dr. J. W. Baker of Fort Kent were elected to membership.

The association indorsed the proposed anesthetic law which the Blue Cross Society of America is endeavoring to secure. This proposed law will make it unlawful to perform any painful major or minor operation on any animal without the use of a general or local anethesia.

Dr. J. B. Reidy gave an interesting and instructive report on the tuberculosis-eradication conference held at Hartford, Conn., last month.

It was the opinion of medical research men present at that meeting that bovine tuberculosis could under the present system of testing be entirely eradicated from cattle.

Dr. P. R. Baird presented a paper on "Fracture of the Os Suffraginis."

Attorney Cyril M. Joly gave a talk on "Rights and Liabilities of the Veterinarian." This talk showed that the speaker was well versed on the subject and held the close interest of the members present, in recognition of which Mr. Joly was elected to honorary membership in the association.

Drs. A. Joly, A. J. Neal and C. F. Davis appointed a committee to investigate reported irregularities in applying the tuberculin test for interstate shipment.

After a lengthy discussion it was voted that a committee of five be appointed to meet and confer with government and State officials in an effort to evolve new policies in regard to tuberculosis eradication. It was the consensus of opinion of those present that the public should pay for the tuberculin test as they are the ones to receive the protection and benefit.

Mr. H. M. Tucker of Augusta was elected to honorary membership.

The next meeting will be held October 11, in Augusta.

P. R. BAIRD, *Secretary.*

KENTUCKY VETERINARY MEDICAL ASSOCIATION

The Kentucky Veterinary Medical Association met at Lafayette Hotel in Lexington, Ky., on July 12 and 13. It was indeed a criterion of the meetings held in the past several years, where harmony and good-fellowship were in abundance. Added to this were the unusually good papers presented and extraordinary good clinics conducted by Dr. J. F. DeVine. The meet-

ing was called to order by President J. K. Ditto. Commissioner Wood G. Dunlap of Lexington welcomed the association in true Kentucky manner. His description of the "Used to be South" and the present South was enjoyed by all.

He congratulated the members for having as co-workers Professors Good, Anderson and Hooper of the Kentucky Agriculture College.

Dr. McVeay, President of the Kentucky Agricultural College, welcomed the association and invited us to partake of the facilities of the college at any time we felt called upon to do so.

Response for the association was made by Dr. D. E. Westmoreland who thanked Commissioner Dunlap and Dr. McVeay. He urged the members to cooperate more closely with the college.

In the President's address, Dr. J. K. Ditto thanked the various committees for their untiring efforts and outlined in a general way the bright future of the association.

Dr. W. M. Coffee's paper on "Problems Confronting the Private Practitioner," brought forth food for thought. He emphasized the importance of conducting our profession along a more ethical line.

In the absence of Drs. Callsemier and Miller, Dr. H. Gieskemeyer read a paper on the "Physical Examination of Animals" with regard to diagnosis. He dwelt on the importance of a thorough examination of the various systems.

Dr. W. P. Moody read a paper on "Milk Fever."

Prof. J. J. Hooper's paper on "The Development of a Dairy Herd" was of considerable interest. He viewed the dairy herd from the stockman's viewpoint as well as the veterinarian's.

Dr. U. G. Houck's paper on the "Activities of the Bureau of Animal Industry" plainly showed the phenomenal strides the U. S. B. A. I. has made in the last few years.

The members of the Lexington Board of Commerce called for the veterinarians at 3 p. m. and a delightful tour of the more important stock farms was made, including a visit to "Man of War." Lantern slides were shown after dinner at the Hotel by Dr. T. P. Polk and Dr. D. Smith. The slides were arranged as a burlesque on various members of the association and all enjoyed the cartoons drawn by Dr. Smith. His slides also dealt with sanitary and insanitary conditions of barns.

The first paper on the program for the second day, entitled "Genetics of Animal Breeding," by Prof. W. S. Anderson, was a very interesting one. Prof. Anderson in his usual thorough way dealt with every angle of this subject. He produced some very important data on abortion and sterility.

Prof. Good, in his paper on "The Problems of the Livestock Breeder," emphasized the importance of eliminating the "scrub sire," stating that the progress of the livestock industry of the South depended entirely on the maintenance of purebred sires.

Dr. W. W. Dimock next read a paper on "Progress of Investigation of Sterility in Mares." His paper created considerable interest and the details and data paved the way for the papers and clinic that followed by Dr. J. F. DeVine of Goshen, N. Y.

Dr. DeVine's paper on "Abortion and Sterility" was a lengthy survey of all conditions that might tend to influence abortion and sterility. It was an interesting review without a dull moment. His clinic was the most interesting one ever enjoyed by the association. Assisted by Dr. H. Gieskemeyer, he examined ten head of cattle and four mares.

His ability to lecture and work simultaneously proved unique. Later postmortems were held on the subjects displaying conditions as outlined by Dr. DeVine in his examinations.

On account of lateness of the hour we were compelled to "cut" the balance of the program. However, the examination of veterinarians for accredited-herd work was held, about ten members being examined. This closed a meeting that we were all glad to have attended.

J. A. WINKLER, *Secretary.*

VIRGINIA VETERINARY MEDICAL ASSOCIATION

THE VIRGINIA Veterinary Medical Association met in semi-annual session in Blacksburg, Virginia, on July 13, as guests of the Virginia Polytechnic Institute. At one o'clock on that afternoon the meeting was called to order by Second Vice President, Dr. G. W. Rawson, of Charlottesville. The meeting was opened with invocation by Rev. W. C. Taylor, one of the college chaplains. Following this was the address of welcome by Dr. Julian A. Burruss, president of the college. Dr. Burruss was very generous in his welcome of our profession to the

institution, giving us the keys, as it were, with full authority to appropriate to our use all the pleasures and facilities the college could afford. Dr. T. M. Owen, a former vice president of the Association, made the response to the address of welcome, which was done in his usual pleasant and gracious manner.

Following this, Professor H. L. Price, Dean of the School of Agriculture, explained the work of the school in its relation to the entire institution and the lines of endeavor under the heads of residential, research and extension. Dean Price explained in detail the effort that is being made to extend, or carry the institution to the farmer that he may receive through the Extension Department those things which are discovered in the Experiment Station and taught to the students in the classroom.

The work of the Experiment Station along research lines, particularly animal husbandry and poisonous plants found in pastures, was explained by Dr. A. W. Drinkard, Director. This address was very interesting and of great benefit to all present. Dr. Drinkard gave the results of experiments conducted with poisonous plants found in the pastures of Southwest Virginia, particularly the mountain coves, covering three plants known as wild hemlock, Dutchman's breeches, and squirrel corn.

Dr. J. I. Handley, of Atlanta, gave a very strong address on ethical methods of advertising. He gave us many questions to ponder upon during our leisure hours.

At four o'clock in the afternoon an auto excursion was enjoyed which carried the guests to our dairy barns, experiment station, and to the new shops building. At six o'clock a picnic supper was served on the college campus by Dr. and Mrs. Chrisman to the members of the association as their guests.

At eight o'clock a business session was held over which President H. S. Willis presided, and at which the following resolution was received and approved:

Resolution of Respect.

Your committee beg leave to submit the following:

Dr. Charles Barnwell Robinson was born in St. Thomas, Ontario, Canada, July 26, 1859. He received his primary education in the city of his nativity and later graduated from Guelph Agricultural College. In April, 1882, he also graduated from McGill University, Veterinary Department, with honors. He

began the practice of his profession in Wheeling, W. Va., where he continued for six years and was there married to Miss Dora Flading.

In 1888, because of a more promising outlook, he moved to Washington, D. C., to practice his chosen profession. He was there appointed veterinarian to the government of the District of Columbia, which position he held until his earthly task was accomplished here; he also served as veterinarian to the War Department.

In 1891 he established a hospital in Washington, and on February 24, 1894, he founded the United States College of Veterinary Surgeons, of which he was president until his death. This institution has grown from one small room to a spacious five-story building, and stands as a monument to his skill, energy, and industry, and from which has gone forth many of his students to various parts of the country, who will cherish his memory and lament his departure.

He was a man of recognized ability and prominence in his profession, and among men, and possessed a high moral character. He was a member of the Virginia State Veterinary Medical Association, the Maryland State Veterinary Medical Association, and the District of Columbia Veterinary Medical Association.

By his integrity and assiduity, he won for himself not only a name in his profession and among men, but a neat little fortune, which he leaves to his children, together with a good name which "is rather to be chosen than great riches."

On December 19, 1921, he died in the 63d year of his age, loved and lamented by all who knew him. He is survived by his widow, one daughter, Mrs. Carrie R. Smith, two sons, Charles and Joseph, all of Washington, D. C., and a host of appreciative and sympathizing friends.

Therefore be it resolved:

First, that this association keenly feels the loss and deeply deplores the going of this eminent and valuable member of our association; and that we bow in humble submission to the wise providence of the Great Physician who makes no mistakes; His will be done.

Second, that a copy of these resolutions be sent to the family of the deceased and that a page in the minute books of this as-

sociation be dedicated to the memory of our beloved fellow-member.

GEO. C. FAVILLE,
H. H. ADAIR,
J. G. FERNEYHOUGH,

Committee.

The time and place of our next meeting was decided upon—Richmond, Va., January, 11 and 12, 1923.

Following the business session, Dr. H. H. Adair, of Bristol, reported on several very interesting cases, as did Dr. C. W. Boone, of Roanoke.

The following morning, with President Willis in the chair, Dr. A. J. Burkholder, of Indiana College, gave a very strong talk on the field preparation of pathological specimens for laboratory diagnosis. This address filled a long felt want and our practitioners were greatly pleased with his suggestions.

Dr. M. Jacob, of the University of Tennessee, gave an interesting address on several of the new diseases making their appearance in his and adjoining states under the head of "Some Observations of Practical Interest." The practitioners greatly enjoyed his discourse and found it very helpful.

Dr. J. W. Adams, of the University of Pennsylvania, gave his clinic, which continued until six o'clock in the afternoon. This was one of the most interesting and instructive features of the program. The members were all loath to leave at the time of the departure of their trains. They all stated that this feature was one of the most helpful that they had attended in many years.

Dr. H. Bannister, of Tampa, Florida, for many years a hard worker of our association and a charter member, having filled every office in the association and having served on our examining board as its secretary for fifteen years, was our guest. It was a great pleasure to have Dr. Bannister with us. It is with deep regret, however, that he is not a resident of the State and an officer of our association and examining board.

Dr. Thomas Fraser, of Richmond, for many years on the examining board, succeeded Dr. Bannister as secretary. Dr. H. H. Adair was appointed by the Governor to fill the vacancy caused by the resignation of Dr. Bannister. The examining board held its regular meeting on the 13th and had before it eight candidates.

On the 14th at 12 o'clock, the association gave a luncheon in the college dining hall. Several tables were attractively arranged by Mr. Owens, college steward. With the assistance of several of the students taking the summer school work, Mr. Owens distinguished himself by serving in a delightful manner.

The following gentlemen responded to toasts: Dr. Adams, University of Pennsylvania; Dr. Jacob, University of Tennessee; Dr. Burkholder, Indiana Veterinary College, and Dr. Handley, Atlanta, Ga.

Our president, Dr. H. S. Willis, of Gordonsville, and Dr. G. C. Faville, of Hampton, gave interesting talks and many of the younger members would have been called on had it not been for the fact that a clinic previously arranged for 1:30 compelled us to adjourn. Several of the members attending the association were accompanied by their wives, who were our guests at the luncheon.

Dr. J. G. Ferneyhough, our State Veterinarian and former president of the association, acted as toastmaster. His usual spicy manner filled the hour with laughter and merriment.

W. G. CHRISMAN, *Secretary*.

NORTH DAKOTA VETERINARY MEDICAL ASSOCIATION

The North Dakota Veterinary Medical Association held a very enjoyable and interesting session July 18 and 19. The place of meeting was at the Veterinary Building of the Agricultural College at Fargo. The principal speakers on the program were Dr. C. P. Fitch and Dr. W. L. Boyd of the University of Minnesota and Dr. J. N. Frost of New York. Dr. Fitch addressed the association on the subject of "Bovine Infectious Abortion," Dr. Boyd on "Sterility" and Dr. Frost, "Diseases of the Udder." These eminent authorities handled their respective subjects in a clear, concise manner and the many questions and the lively, interesting discussions following each of the addresses demonstrated that these conditions are becoming very important in the practice of North Dakota veterinarians. Dr. Boyd made use of a set of lantern slides to demonstrate part of his lecture and also demonstrated the method of diagnosing cystic conditions of the ovaries and how such conditions can be overcome by manipulation. Six sterile

cows and one purebred Belgian mare, taken from the college barns, afforded material for this demonstration. Dr. W. F. Crewe, State Veterinarian, and Dr. H. H. Cohenour, Inspector in Charge of Bureau work in the State, presented a joint report on the progress of the tuberculosis eradication work in the State of North Dakota. This was a very excellent report and was followed by a general discussion which cleared up any obscure points concerning this work. The following officers were selected to head the association for the following year: Dr. Vego Mikkelson of Starkweather, President; Dr. A. F. Elliott of Milton, Vice President; Dr. R. S. Amadon of the Agricultural College, Secretary; and Dr. B. C. Taylor of Hillsboro, Treasurer. The meeting adjourned late in the afternoon of the 19th and many of the members went out to the fair grounds to view the exhibits of the North Dakota State Fair which was being held during that week. All members in attendance at the meeting expressed great satisfaction with the program presented and plans are already under way for a program of equal quality next year.

R. S. AMADON, *Secretary.*

MARYLAND VETERINARY MEDICAL ASSOCIATION

The fourth semi-annual meeting of the Maryland Veterinary Medical Association was held at the University of Maryland, College Park, on July 20 and 21.

During the morning of the first day, Dr. A. F. Woods, President of the University, conducted the early comers through all the college buildings and laboratories. The pathological exhibit of mounted specimens and charts from the Bureau of Animal Industry collection, in the Agricultural building, was most interesting. A short walk to the University dairy buildings then permitted the members and guests to witness the injection of half of the herd for the intradermic tuberculin test, the other half having been injected seventy-two hours before. These latter were examined and, as was to be expected, no reactors found.

Following luncheon in the University Dining Hall, a demonstration of ovariectomy of the bitch was given by Dr. William Collins, of Washington, with a discussion of its complications and after treatment. The suture used for the skin opening, continuous and through the derm only, was new to many. Its

advantages were stated to be that healing was very prompt, the scar small or invisible and that it left no depressions or scars on either side of the median line as is usual with the interrupted suture.

Following the operation, we listened to a most interesting paper by Major John P. Turner, also of Washington, D. C., on "Udder Troubles," and still later to one read for Dr. Pickens, of the University staff on "The More Important Infectious Diseases of Poultry Encountered in Maryland."

Major Turner's very wide experience with dairy cattle is well known and as most of our members engage in cattle practice to a considerable extent, his views were given close attention and the discussion which followed brought out many moot points and profitable experiences.

All freely admitted the importance of the last paper presented, but pleaded a shameful ignorance of the subject.

Following our afternoon session, a banquet was given our members and guests at the University Dining Hall by Dr. Woods. In the more or less relaxed and happy mood which accompanies such a treat, an inquiry was started as to the disposition of certain moonshine rays (or jugs) noted at our last summer's meeting at Deer Park, with no definite result. Dr. W. L. Williams, of Ithaca, New York, concluded our after-dinner speeches with a most sound and sane plea to each veterinarian present to make the most of scientific possibilities and himself an indispensable member of present-day society.

At the business meeting of the association, held following the banquet, our Legislative Committee reported the failure of their efforts to secure the passage of a revised Act to Regulate the Practice of Veterinary Medicine in Maryland; the Committee on Cooperation reported a conference with the State authorities and the probability that the results would be shown in the next issue of the State Regulations Governing Live Stock; and a committee of three was authorized to discuss and report upon a fair and just fee to be charged for tuberculin test work, more particularly the intradermic test.

The next morning the association was treated to a most interesting address by Dr. W. L. Williams, of Ithaca, N. Y., on "The Mating of a Sexually Sound Female with a Sexually Sound Male as the First Principle in the Physiological Reproduction of Young." Dr. Williams made it perfectly clear that

much yet remains to be done before our understanding of this subject will become general. His observations in both breeding studs and dairy herds indicate that the male has been given all too little attention and study and that the sterility of the female does not alone depend upon pathological conditions within her body.

Following a second observation of the herd and luncheon, we were entertained and instructed by Dr. Louis A. Klein, of the University of Pennsylvania, on "Digestive Disturbances of the Rumen of Cattle." Dr. Klein's mastery of this subject is complete and his conclusions logical. His suggestions as to the early recognition and treatment of such conditions were given particularly close attention and led to most of the questions and discussion.

Our association was further honored by the presence of Dr. John R. Mohler, Chief of the Bureau of Animal Industry, who gave us a wonderful word picture of the work of his organization, its past accomplishments and present plans. No veterinarian may see and hear Dr. Mohler without a feeling of hope for and pride in his profession and of respect for himself and his work.

Certainly all present departed with a knowledge of two days profitably spent and a resolution to digest and use what had been so generously given by our contributors and to attend any and all future gatherings of like kind.

HULBERT YOUNG, *Secretary.*

NORTHWESTERN VETERINARY ASSOCIATION

The annual meeting of the Northwestern Veterinary Association, which is composed of the associations of Idaho, Washington, Oregon and British Columbia, was held in the Blue Room of the Hotel Vancouver, Vancouver, B. C., July 21 and 22.

The meeting was called to order by Dr. A. J. Damman, of Vancouver, B. C., President of the British Columbia Veterinary Association. Shortly after the Secretary read a telegram received from Dr. S. F. Tolmie, M. P., stating that owing to indisposition he would be unable to be present, and wishing the meeting every success. Dr. Damman then took the chair and the meeting proceeded as per program. Full discussion took place on all papers; in fact it was late Saturday evening before we concluded a very instructive two days session.

Before beginning the session on Saturday morning, the convention was addressed by Prof. Boving, Acting Dean of Agriculture of the University of British Columbia, who emphasized the value of farming in this Province, and welcomed the members of the convention to the University.

On Friday evening we were fortunate in being addressed by Hon. W. R. Motherwell, Minister of Agriculture for Canada, who was on a tour of the West. Mr. Motherwell told us of some of his early veterinary experiences in Saskatchewan in the early days, one in particular in which he was bitten by a horse affected with glanders, which before the arrival of the veterinarian he did not think had glanders. He said that his trouble was that he could not get enough competent veterinarians at the present time to carry on the work of the Dominion. He concluded by saying that veterinarians could not be expected to do proper work without the proper equipment and facilities and referred to the addition to the Laboratory of the Health of Animals Branch that is being built now at Ottawa.

Mr. Motherwell was given hearty applause and thanks before he left.

I will not attempt to enumerate the names of the veterinarians that discussed each paper, but would mention two that are non-veterinarians.

The program was shown to Dr. P. Mullin, M. D. bacteriologist of the Vancouver General Hospital, and he asked permission to be present to hear the paper and discussion on rabies. This was readily granted and at the conclusion Dr. Mullin gave us some of his experiences with the disease in Montana and Arizona in man and animals, and concluded by relating to the amusement of all about the man in Montana who was protesting that there was no such thing as "rabies" and who came to a meeting for that purpose and put up \$500.00 at the meeting that he could prove it.

This was promptly covered by another \$500.00 by men at the meeting, and he was told he would win the bet if he would go into a room in the basement into which they had previously placed a dog affected with rabies, in anticipation that this gentleman might be present at the meeting. Needless to say, Dr. Mullin told us that the man would not go in.

The other non-veterinarian was Mr. R. Gross, of the Mainland Transfer Company of Vancouver. Mr. Gross assisted Prof.

Hare in the preparation of his paper, "The Economic Value of the Horse versus the Motor," and after it was read told us of his experiences in a large transfer business in which cost accounting system is used, as he said he could tell us what any dray made or lost on any date, each horse, rig and truck having its own separate profit and loss account. He has now only two trucks in his business, and he told us that the horse was far superior to the truck in the transfer business, and gave us the reasons therefor, and told us what other transfer companies were doing in the way of discarding trucks for horses. He concluded by telling us of the truck salesman who wanted to sell him a truck badly, and repeatedly asked permission to give Mr. Gross a demonstration. Finally Mr. Gross said yes he could demonstrate tomorrow morning. He had a lot of canned salmon to unload from the wharf to a warehouse, a short level haul, and he gave him his best swamper to help him and told him that if he could unload as much as two teams that day he would buy his truck. The truck salesman came up to the office at noon and Mr. Gross inquired as to what was the matter. The salesman said he was through. "Why," asked Mr. Gross. The salesman replied, "I always understood that a team of horses could move about two ton, but I never knew before that a team moved *seven* ton at a time." He was a wiser man, and it seems that we veterinarians should wise ourselves up to know what our good friend the horse can do.

Mention had been made previously of a team of heavy work horses that had just recently been sold in Vancouver, B. C., for \$1,200.00, and we had noticed a smile of incredulity on the faces of our American friends. Mr. Gross, on being brought back into the convention room and asked if it were true, said yes, as he sold them himself to a logging company, and that good large horses are in good demand. Mr. Gross regretted he could not stay longer with us, but had to go to an exhibition committee meeting.

Speaking of \$1,200.00 for a team, you would expect to pay much more than that if you went to buy a truck, and it would not do any more work on the short hauls, and cost more in upkeep and depreciation. The object of this paper was to give the veterinarians some figures so as to enable them to intelligently discuss the subject with their clients and so give the other side of the picture to that of the truck and tractor salesman.

On Saturday afternoon we climbed into two touring busses and went around the Marine Drive to the University grounds, where we had a get-together meeting with some poultrymen of British Columbia, who were out there on a field day, and then listened to an address by Dr. Johnson, of Puyallup, Wash., on the "Value of the Veterinarians to the Poultrymen." The poultry industry in Washington and British Columbia has assumed large dimensions and with increased production and forced feeding, diseases are appearing which the veterinarian should study and meet. At the present time the practicing veterinarian knows nothing of poultry diseases and so can not give service, and the poultryman does not think of the veterinarian as being able to assist him. It is the logical work for the veterinarian, but until he becomes competent he can not expect to be called in. On the other hand, the veterinarian says, "If I do go to the trouble and expense to become competent, will the poultryman employ me?" It is a matter of mutual confidence and a getting together which was the object of the meeting, the first of its kind in British Columbia.

We returned and took up resolutions, which were of local interest to the Washington and Oregon members, with the exception that we endorsed again the resolution of the Oregon association inviting the A. V. M. A. to meet in Portland, Oreg., in 1925.

Finally the place of the next annual meeting was discussed. Some favored Eastern Washington and others Oregon, but the Eastern Washington men withdrew their motion, and it will be held in Oregon next year, at a time and place to be decided on by the Secretary of the Oregon association. There were over 65 veterinarians present at the convention which, considering the bad times and the great distances that some had to come, was very pleasing to those that had gone to the trouble of arranging it and preparing the papers. May the next year's meeting be even bigger.

KENNETH CHESTER,

Secretary, British Columbia Association.

SOUTH CAROLINA ASSOCIATION OF VETERINARIANS

The thirteenth annual meeting of the South Carolina Association of Veterinarians was a surprise to its oldest member, Dr. Benj. McInnes. It was held at the Timrod Inn in Charleston, S. C., July 24 and 25.

The meeting was well attended and some very interesting and instructive papers were read.

The evening session consisted of a sumptuous banquet that was enjoyed by all.

On the second day the guests were taken over the city and on a trip to Folly Beach, where they enjoyed surf bathing.

M. R. BLACKSTOCK, *Secretary*.

SOUTHEASTERN STATES VETERINARY MEDICAL ASSOCIATION

The officers of the Southeastern States Veterinary Medical Association met in Chattanooga, July 4, and outlined plans for the coming meeting to be held in Chattanooga on November 20 and 21, this year.

The convention will last two days and particular attention will be given to subjects that interest the practitioner. Several prominent practitioners will be on the program and as a special feature we will invite the next President of the A. V. M. A. and also Dr. John W. Adams, University of Pennsylvania; John R. Mohler, Chief of B. A. I.; Dr. Eichhorn of Lederle Laboratories; G. A. Roberts, Brazil, South America, and Tait Butler of the *Progressive Farmer*.

The afternoon of the second day the association will be in charge of the Chamber of Commerce of Chattanooga, which will entertain the association in an automobile trip to Lookout Mountain, Chickamauga Park and Missionary Ridge.

All veterinarians in the Southeastern States and any others interested in this meeting are especially invited to be present. Programs will be mailed out on October 15. Any communications should be addressed to the Secretary, P. O. Box 1533, Atlanta, Georgia.

JOHN I. HANDLEY, *Secretary*.

Under the heading "The Kind We Sometimes Eat," *The Literary Digest* quotes the following classified advertisement from a Pennsylvania paper: "For Sale—Two thoroughbred Antediluvian roosters."

That skull a half inch thick that was found in Arizona will be sent to Washington. They usually are, you know.—*Life*.

NECROLOGY

Lieut. Lloyd J. Brown was born at De Graff, Ohio, February 15, 1887. He graduated from the Centralia, Kans., high school in 1906, and from the Kansas City Veterinary College in 1910. In 1917 he entered the U. S. Army and crossed with the American Expeditionary Forces as an officer of the Third Division. Following the Armistice, he was sent to Germany with the Army of Occupation. Returning to the United States he chose to remain with the Army and at the time of his death, June 22, 1922, was stationed at Fort Des Moines, Iowa. His death came as a great shock to his family and friends. He had returned to duty after a sick leave of some weeks, perhaps too soon, for his strength collapsed while on duty and died in the Army hospital of heart failure. The funeral service was held Sunday afternoon, June 25, 1922, at the Congregational Church at Centralia, Kans. The service was conducted by Rev. R. D. Bussey, pastor, assisted by Rev. J. E. McClain. The funeral march was played by the Centralia band; music by a mixed quartet. Dr. J. M. Lawson, a former classmate, sang "No Night There." The burial at the Centralia Cemetery was conducted by the Armstrong-Moyer Post of the American Legion with full military honors. Veterinarians attending the funeral were Dr. L. T. Richards of Parsons, Kans.; Drs. Lawson and Crandall of Seneca, Kans.; Dr. H. C. Gale of Clyde, Kans.; Drs. C. H. Burdett and Cecil Wilhoit of Centralia, Kans.

Funeral services for Mrs. William F. Flanary, aged 33, wife of Dr. Flanary, were held at the Catholic church at St. Charles, Minn., and were conducted by the Rev. John Horan. Mrs. Flanary died in a Rochester hospital on July 4, after a protracted illness from Bright's disease.

The British Ministry of Agriculture, in support of a measure pending in Parliament to extend the Government's powers to meet the cost of the existing epizootic of foot-and-mouth disease, estimates that the total cost of this outbreak will not exceed one million pounds sterling.

FOX PARASITES BEING INVESTIGATED

Dr. H. L. VanVolkenberg, who is regularly stationed at the experimental fur farm of the Biological Survey of the United States Department of Agriculture, at Keeseville, N. Y., engaged in investigation of diseases to which silver foxes and other fur bearers are subject in captivity, will be in Washington for the next two months in order to consult literature bearing on the problems upon which he is engaged. Diseases to which fur bearers are subject when reared in captivity are proving an important feature in the development of this industry and the investigations to determine the causative agencies and means of prevention and cure are being pushed vigorously. Doctor VanVolkenberg has secured valuable material showing the effect of internal parasites on fur bearers, and this will be thoroughly studied as a basis for preventive and curative measures.

VETERINARY PROSPECTS IN SOUTH AMERICA

It is interesting to learn from Dr. H. K. Wright, of the H. K. Mulford Company, Philadelphia, that conditions in South America, with reference to livestock, are almost identical with conditions that prevailed in western United States a few years ago. Practically all animals are on range and no attempt is made to secure a veterinarian's services for individual animals. Veterinarians are seldom called, except in connection with outbreaks of dangerous, transmissible diseases.

Dr. Wright has just returned to Philadelphia after a sojourn of over 15 months in the Argentine, Chile and Peru. He is of the opinion that present prospects for a veterinary practitioner in South America are not very alluring. It would undoubtedly be a very uphill fight to establish a general practice there.

In the first place, a man would have to speak the language of the country very well and a long residence would be necessary for him to become thoroughly acquainted with the customs of the people, their methods of conducting their affairs, etc.

If an opportunity is presented for a veterinarian to take up special work in South America—i. e., for one of the governments, an individual livestock owner, a group of owners or other interests—a definite contract should be entered into, including arrangements for transportation to the U. S. A. upon expiration of the contract.

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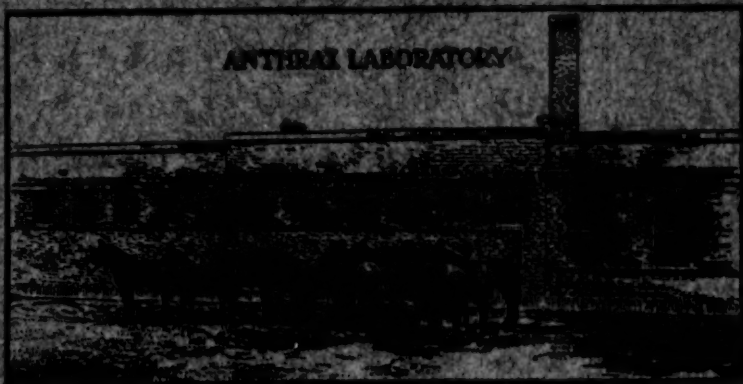
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